PATENT POLICIES OF DEPARTMENTS AND AGENCIES OF THE FEDERAL GOVERNMENT—1959

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE SELECT COMMITTEE ON SMALL BUSINESS UNITED STATES SENATE

EIGHTY-SIXTH CONGRESS

FIRST SESSION

ON

THE EFFECT OF FEDERAL PATENT POLICIES ON COMPETITION, MONOPOLY, ECONOMIC GROWTH, AND SMALL BUSINESS

DECEMBER 8, 9, AND 10, 1959

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PATENT POLICIES OF DEPARTMENTS AND AGENCIES OF THE FEDERAL GOVERNMENT

TUESDAY, DECEMBER 8, 1959

U.S. SENATE,
SUBCOMMITTEE ON MONOPOLY,
OF THE SELECT COMMITTEE ON SMALL BUSINESS,
Washington, D.C.

The subcommittee met, pursuant to call, at 10:05 a.m., in room 457, Old Senate Office Building, Senator Russell B. Long presiding.

Present: Senator Long (presiding).

Also present: Walter B. Stults, staff director; Benjamin Gordon, economist; T. Peter Ansberry, counsel; Hamilton Richardson, legislative assistant to Senator Long; Catherine L. Guyon, legislative assistant to Senator Scott; and Robert L. Wright, chief counsel, Subcommittee on Patents, Trademarks, and Copyrights, of the Senate Judiciary Committee.

Senator LONG. The hearing will come to order.

Today, tomorrow, and Wednesday the Monopoly Subcommittee of the Senate Small Business Committee is conducting hearings as part of its study of (1) the patent policies of the departments and agencies of the Federal Government, and (2) the closely related problem of Government policies with respect to the acquisition and dissemination of technical information.

There is no one Government patent policy. Various Federal agencies and departments have sharply varying policies with regard to taking title to patentable inventions made under research and development contracts with private organizations. These policies range from automatically giving the patent and all commercial rights to the research firm to the other extreme of taking title to all inventions which result from the contract. One primary purpose of our inquiry is to determine if there are valid reasons for these divergent policies.

The importance of Federal policy in this connection can be appreciated by examining the magnitude of the Federal contribution for basic and applied scientific research and development.

Before the Second World War, between $300 and $400 million a year was spent on scientific research in the United States, and the Government contributed about one-fifth of this total.

During World War II, research expenditures increased to $800 million a year with the Government supplying about $600 million of this total. In the last few years Government expenditures for this purpose have made our World War II effort seem piddling by comparison.

In fiscal year 1958 federally sponsored research and development contracts totaled approximately $5,900 million. In fiscal year 1959 estimates are that this figure will exceed $7,900 million, almost $8 billion, and for the fiscal year 1960 we will spend approximately $8,150 million on research and development. This does not include the several hundred million dollars of private research expenditures.

The magnitude of this effort makes it apparent that the distribution and Federal policies in the handling of the resulting inventions of these contracts have a significant effect upon the organization of the American economy.

These hearings will look into three major problems.

First, there is the problem of increasing economic concentration brought about by the granting of patent rights to individual firms for discoveries which result from Government-financed research and development contracts.

The report of the Attorney General, dated November 8, 1956, insisted that present Federal policy, combined with the disproportionate share of Government research and development contracts going to the largest firms, is strengthening the trend to monopoly and undermining the relative position of small business. The report of the Attorney General, three years later—November 9, 1959—repeats the same warning.[1]

> The advance technological experience of these firms will necessarily have profound effect on their ability to produce the products of the future for civilian markets, and, more importantly, on the ability of smaller firms to compete with them in those markets.

Second, there is the problem of assuring that newly acquired technological information developed at Government expense and not of a classified nature is diffused throughout our society. The American people foot the bill. Do they receive commensurate benefits from this work?

To be equal to the challenge of our times, all our scientific skills must be fully utilized. The rate of our economic growth, in large measure, depends upon the speed with which new technological developments enable us to produce more goods and services, both for peacetime consumption and to ward off possible armed conflict.

The third problem is whether the U.S. Government is getting all that it pays for from its research and development dollar. Is the Government giving away more than it should in the granting of its research and development contracts? Is it possible to recover part, or perhaps all, of our expenditures on research and development?

In view of the magnitude of the sums involved it is appropriate that Congress carefully examine this whole field.

I have a letter here from Senator Joseph C. O'Mahoney, in answer to my inquiry, inasmuch as his Legislative Subcommittee of the Committee on the Judiciary has been conducting investigations in this matter, and I will insert that in the record at this point.

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[1] Report of the Attorney General, pursuant to sec. 708(e) of the Defense Production Act of 1950, as amended, procurement for defense, Nov. 9, 1959.

(The document referred to follows:)

EXHIBIT I

UNITED STATES SENATE,
COMMITTEE ON THE JUDICIARY,
SUBCOMMITTEE ON PATENTS, TRADE-MARKS, AND COPYRIGHTS,
December 4, 1959.

Hon. RUSSELL B. LONG,
Chairman, Subcommittee on Monopoly,
Senate Small Business Committee, Washington, D.C.

DEAR SENATOR LONG: I appreciate very much your invitation of November 27 to express my views as to the present patent policies of Government agencies, and recommendations for the improvement of those policies, and I am delighted to know that your committee is going to gather material in this field. From the hearings which we have already held and the reports which we have made, I think it is clear that definite action should be taken by the Congress with respect to the method by which Government agencies should act, and, inasmuch as your subcommittee hearings are to begin on December 9, I should like to have Mr. Robert L. Wright, the chief counsel of our staff, and such others as he may select, attend the hearings. I am personnally not available for attendance at the subcommittee meeting during this month.

As you know, the Patents Subcommittee of the Senate Judiciary Committee has, for some time, been engaged in an investigation of this matter, and has issued six preliminary reports with respect to the patent practices of Government agencies, which you may wish to incorporate in your record. These reports deal, respectively, with the patent practices of the Tennessee Valley Authority, National Science Foundation, Veterans' Administration, General Services Administration, Government Patents Board, and the Post Office Department. They cover less than half of the agencies which are under study by the subcommittee, but the information assembled to date shows a strong need for congressional action to correct the haphazard methods by which Government patent policy is how made.

While our studies have not been primarily concerned with the impact that these divergent Government patent policies have had on small business, it is apparent to me that small business may have been hurt. For example, where title to patents resulting from a Government-financed contract is retained by the contractor, the effect of the Government research may be to strengthen the power of a corporation which already has a very large patent portfolio to restrict the competition of smaller competitiors with a relatively insignificant patent position.

There are, of course, situations where the contractor should retain title to insure proper exploitation of a patent, because the Government ordinarily makes no effort to exploit commercially any patent that it may own and does not ordinarily give anyone an exclusive license. However, TVA's experience with its fertilizer patents certainly casts doubt on the thesis that private enterprises are not interested in exploiting Government-owned patents on a nonexclusive basis.

I hope that your subcommittee will determine from small businessmen themselves, whether they feel that the Government, by generally licensing the patents it owns to all comers on a royalty-free basis, discourages or encourages the use of these patents. I am sure that you will also explore at your hearings the question of whether an opportunity to obtain an exclusive license would stimulate greater interest int he use of Government-owned patents by small business.

The work of this subcommittee has not yet progressed far enough to justify any recommendation by it or by me as to what, if any, specific changes ought to be made in existing Government patent policies. We are convinced, however, that the extent and nature of the changes to be made should be determined by the Congress itself rather than by the individual adminstrators and contracting officers of the Government agencies involved.

With kind regards,

Sincerely yours,

JOSEPH C. O'MAHONEY, *Chairman.*

Senator LONG. The first witness today will be Prof. Daniel Hamberg, of the University of Maryland.

Mr. HAMBERG. Thank you, Mr. Chairman.

STATEMENT OF DANIEL HAMBERG, UNIVERSITY OF MARYLAND, COLLEGE PARK, MD.

Senator LONG. Dr. Hamberg, I believe you have been informed that our procedure will be in accordance with the Legislative Reorganization Act, wherein you are requested to bring a prepared statement, which I would like to put in full in the record, and then to summarize your statement in your testimony today.

Mr. HAMBERG. The Senate Small Business Committee is to be warmly congratulated for its investigation of the patent policies of Federal agencies. Especially crying for study is the policy of virtually all Federal agencies (with the exception, I believe, of the Atomic Energy Commission, the Department of Agriculture, and the Tennessee Valley Authority) of permitting private corporations to secure patent rights to inventions developed by the corporations under Federal financial sponsorship. This policy possesses all the inherent and potential disadvantages of the patent system and none of the latter's alleged advantages.

Whatever their merits, it is undeniable that patent rights confer monopoly powers on the patentee. Patents enable their owners to restrict the use of inventions, thereby restricting the contributions to the national product that the patented inventions could make, in the hope that the resulting higher market prices will make possible (monopoly) profits in excess of what could be earned under competitive conditions. To deny this feature of the patent system would be tantamount to denial of any usefulness of the patent system.

Implicit in this essential characteristic of the patent system is a retardation in the rate of diffusion of inventions. Why has society erected a legal institution that impedes the diffusion of technological knowledge? The answer lies in the belief that the monopoly profits made possible (if not guaranteed) by the patent system will act as an inducement to further, and even raise the rate of, invention and innovation. In a word, the patent system was conceived in the paradoxical expectation that by slowing down the rate of diffusion of inventions, there will be more inventions to diffuse.

What is the argument for the patent system and what is its relevance to the problem at hand, namely, the granting of patent rights to corporations conducting research under the financial sponsorship of the Federal Government?

Basically, the argument for a patent system, as such, is an incentive argument.

The profit expectations connected with the hope for a patent monopoly may induce inventors to exert their inventive efforts, or, in the modern scheme, induce corporations to maintain expert staffs of scientists and engineers and expensive research laboratories; the same profit prospects may induce venturesome capitalists, or their modern counterparts, the great corporations, to risk their money on uncertain and expensive development projects and pilot plants, and on the equally and uncertainty-laden tasks of building up markets. It may

be granted that patent-monopoly profits stem from output restrictions, and are thus inherently associated with underutilization of a recently developed piece of technology. But it is argued that this is the price we must pay for a system that fosters the development of new technologies and thereby ultimately permits a more rapid growth in total production than would be possible in its absence.

Without pausing to examine the validity of this argument, and there are many grounds for questioning it, let us scrutinize its applicability to the case of Government-financed research carried on in the private sector of the economy. Perhaps the most notable feature of such activity is the total absence of all financial risk on the part of firms conducting the research and development. Virtually all R. & D. contracts let by Federal agencies and departments are on one sort of "cost plus" basis or another. No results are guaranteed, nor can they be, of course. But no mater how difficult or expensive a project turns out to be, the costs are covered by the Government. The contracting firm pays not 1 cent from its own pockets. Not only is it renumerated for the basic invention for which it is responsible, but the Government bears all the costs of development work attached to it. Furthermore, there is no market to be developed. The market is there, waiting eagerly, in the form of the Federal agency or department for whom the R. & D. has been performed. In short, the whole thing is virtually a riskless venture for the contracting corporation. If there is a possible risk, it is that of contract cancellation. But even this can hardly be described as a risk, for it remains true that the firms have invested none of their own funds, and are always granted a return well in excess of costs, to boot.

What becomes of the "incentive" argument in this case? The answer, of course, is that it collapses completely. If there are no risks there is no justification for a monopoly profit such as might accrue from patent rights. But since the patent rights are clearly not needed to serve as an inducement to invent and innovate, while they simultaneously impede the diffusion of technological knowledge uncovered at public expense, the granting of patent privileges to the contracting firms clearly gives society none of the alleged advantages of the patent system while foisting upon us one of its decisive disadvantages.

It is undeniable that the whole basis of a patent system is the power inherent in the monopoly position that the patent grants, that is, the power to slow down, retard the rate of diffusion of inventions, so that the patent owner may receive a higher profit thereby.

Consequently, while there might be an argument for accepting this cost of a patent system as the price we pay in order to induce more invention and innovation at private expense, in the case at hand where the Government covers all the financial costs, bears all the financial risks of invention and innovation, we are clearly receiving no advantage here, while accepting the decisive disadvantage or one of the decisive disadvantages of the patent system, namely, the retardation of the diffusion of invention.

Lest the committee infer that the withdrawal of patent privileges from firms performing R. & D. for the Government at the latter's expense will remove all competitive advantage accruing to such firms, let me hasten to caution against any such inference. There are inherent advantages in performing such work that exist quite apart from patent privileges.

Where there is fortuitously direct and immediate commercial applications, or where the contracting firms will take contracts, as they often do, only when the R. & D. is relevant to technical and, hence, commercial problems already confronting the firm, the result is in either case that although the firm may provide the Government with a sought-for "product," the firm in the process gets its R. & D. costs financed by the Government.

A second important advantage is that the finance that the contracting firm receives from the Government enables the firm to acquire scientific personnel that it ordinarily might be unable to do.

This is certainly one of the paradoxes, I think, of the present system of having the Government finance R. & D. in the private sector, because, unquestionably, the contracting firms are thereby enabled to bid up the prices, the wages and salaries, of scientific and technical personnel.

In the process they compete away such personnel from the Government sector, from Government research and development laboratories. The Government is, thereby, deprived of its own highly qualified personnel, and in the end winds up paying more for R. & D. than it otherwise would because it now must pay the higher costs involved as a result of the bidding away of scientific personnel from the Government.

So the Government finds itself not only, I think, spending more on R. & D. as a result of this situation, but also finds itself confronted with a shortage of scientific personnel that it itself has created.

Thirdly, we should note that the performing firm, ipso facto, acquires a considerably body of information relating to the invention, information that is unpatentable, but possession of which is often indispensable to the proper use of the invention.

This information is known colloquially as "know-how."

In the case of a new product or material, this know-how includes the relevant experience accumulated in the early stages of production, during which many minor modifications may be made in the design or production process. Similarly, invaluable information is often accumulated during the trial runs or pilot plant testings of new processes. Such information is typically unpublished and remains as confidential information in the possession of the firm's operating personnel. The withdrawal of patent rights from performing firms would not and could not deprive them of this often priceless know-how.

In concluding this opening statement, I should like to draw the committee's attention to one other problem created by the present pattern of the Government-research expenditures. Whether by design, or chance, or more likely, administrative expediency, Government R. & D. contracts have been let primarly to the giant corporations, to the virtual exclusion of small- and medium-size firms. As we have noted above, either with or, in view of the know-how that automatically accrues to the performing firms, even without patent rights, this practice automatically confers great competitive advantages on the giant firms vis-a-vis their smaller competitors, thereby promoting already extant monopolistic tendencies. The withdrawal of patent privileges from the giant firms would only reduce this effect; it would fall far short of eliminating it. The enhancement of monopolistic tendencies is an intrinsic characteristic of the present practice

of concentrating R. & D. contracts in the hands of the giant corporations. The committee would do well to look into ways of getting Federal agencies and departments to distribute R. & D. contracts on a very much broader basis than is now done—in the interests of fostering more competition in the economy generally and, more specifically, in the new industries arising under the spur of new discoveries associated with Government-sponsored R. & D.

I would like to implement that last point with a suggestion for spreading R. & D. contracts on a broader basis by substituting a fixed-fee contract for the presently widely used cost-plus contracts.

The reason is that too often the small firm cannot make anything in the way of a profit, because it may be able to put to work, let us say, only 10 or 15 or 20 men compared with the 500 or so men, let us say, that the large corporation can put on it.

So the cost base is much smaller for the smaller firm than it is for the larger firm and, hence, the percentage it gets in the plus part of the cost-plus contract, winds up as a very small figure that makes it quite impractical for the small firm to undertake these contracts.

On the other hand, the mere fact that the large firms can often put these huge teams of workers on a Government R. & D. contract does not necessarily mean that the large firm will necessarily do any better.

Certainly, as one examines the pattern of inventions in the past, even when conducted within the research laboratories of the giant corporation, one of the outstanding features discernable is that although there may be many, many people at work, usually there are only one or two key personnel involved, very able men, who spark the project, if I may put it so crudely, with the rest largely hanging around or performing more or less menial tasks.

I would suggest that in view of this fact that very often the small firms can do just as well, by putting four or five men to work, with one key operator at the crucial position.

I think it is also commonly, fairly commonly, known that the large firms, in getting these contracts, in putting these large teams to work, frequently throw their least able men on Government contracts because of the cost-plus nature of the contract, and retain some of their best personnel for their own commercial work.

Thank you, Mr. Chairman.

Senator LONG. Professor Hamberg, could you just give a little of your background in this field. Have you taught patent law or economics in this field?

Mr. HAMBERG. My field is economics, Mr. Chairman, and recently I have been concentrating my research in the economics of invention and innovation.

Senator LONG. Do you know, in general, how the British system works?

Mr. HAMBERG. Well, vaguely. I know that the contracting firm is required to pay something like 7½ percent of its sales revenues back to the Government in the case of products that reach the commercial market where the research for them has been conducted under the aegis of the British Government's financial sponsorship, and where they do not market such products commercially, but grant licenses, there is some higher fee they pay, I believe something like 12 percent, 13 percent.

Senator LONG. I believe the figure is 33⅓ percent.

Mr. HAMBERG. I would like to say, Mr. Chairman——

Senator LONG. My understanding is that if the British firm licenses another firm to use its invention developed with Government funds, 33⅓ percent of the royalty goes to the Government.

Mr. HAMBERG. I see.

Senator LONG. I believe that if the company itself markets the product, the Government gets 7½ percent of the selling price.

Mr. HAMBERG. Right.

Senator LONG. What do you think of the British system?

Mr. HAMBERG. I think that sweetens a bad system, and nothing more.

One advantage, of course, is that it enables, it provides a vehicle whereby the Government can recover some of its outlays on R. & D. or perhaps all. But to me, this is a minor consideration in a system of granting patent rights to private corporations where they perform R. & D. at Government expense.

The major consideration, it seems to me, is that the patents are inherently a monopoly right, and they enable the firm, as I have said in my opening statement, to reduce the rate of diffusion of inventions and, therefore, the rate of diffusion of technological knowledge.

This is inherent. If this were not true, there would not be any advantage to the patent system. By reducing the use of the invention, they are enabled to increase their prices, and their revenues and, therefore, earn a profit in excess of what they could receive under competitive conditions.

But the important thing is that they do reduce the rate of diffusion of technological knowledge, and, in addition, they receive potentially broad monopoly powers, which have significant overtones for the efficient operation of the economic system.

It seems to me this is the thing on which we ought to keep our eyes focused, and not a rather minor consideration of recovering some of the R. & D. outlays.

Senator LONG. Your thought, then, is that there is no point in giving a firm a monopoly on what they develop on Government contract because there is plenty of incentive already in the fact that you are paying them to do this research?

Mr. HAMBERG. That is right.

Senator LONG. In addition, you contend that they also gain by doing the research. They gain the know-how which gives them an advantage in getting a production contract on which they also make a profit?

Mr. HAMBERG. Unquestionably.

The argument for a patent system is an incentive argument, a risk argument.

Senator LONG. Yes.

Mr. HAMBERG. Where the firms are being paid to undertake R. & D., there are no financial risks or, at least, negligible risks, negligible financial risks.

Senator LONG. It has been suggested that in view of the shortage of competent research personnel a patent monopoly might be needed as a bonus to induce corporations to devote their best scientific brains to Government research and development. What is your reaction to that suggestion?

Mr. HAMBERG. Well, for one thing, I question—and I am not alone in this—I question the so-called shortage of scientific personnel.

As I also said in my opening statement, part of it is undoubtedly induced by the very Government contracts, at least so far as the Government is concerned, it has found itself with a shortage of personnel that have been drawn away from it by private firms with the Government's own money.

Senator LONG. Do you think, if the Government retains title to the inventions developed on these contracts, that the price of research and development would go up, and we would be required to pay more for it?

Mr. HAMBERG. That is hard to say.

Let me answer that question, if I may, in two parts:

I would say, if they did, this is a cost that we should be prepared to pay.

Every system has a cost. The present system has a cost. It may not show up in the cost of Government outlays on R. & D., but it shows up in the cost of the lower rate of diffusion of inventions. This is a real cost.

Secondly, I would say that the possibility that the Government should submit to pressures to pay higher costs in the event of withdrawal of these patent privileges should be, if it is, a remote one.

This is not an uncommon contention, and I would like to speak to it at a little length, if I may.

Let us place your question in a broader context. It is frequently averred that the withdrawal of the patent privileges might lead firms to refuse outright to perform Government R. & D. work, which is just an extreme case of a higher cost of Government-performed R. & D.

I think we might look at the AEC, the Atomic Energy Commission, experience.

As I understand it, their outlays constitute about 20 percent of Government R. & D. outlays, total Government R. & D. outlays.

They retain patent rights in all cases.

While I do not have the information at my disposal, we could certainly check to see whether the costs of their Government R. & D. contracts are higher than the costs, let us say, of the Defense Department's contracts in view of this different approach.

Then, it seems to me that a national government that allows itself to be bullied, and I use that word very intentionally, allows itself to be bullied, into the threat of refusal of R. & D. contracts by private firms because they cannot retain patent rights, that national government that allows itself to be so bullied underestimates its own powers.

Senator LONG. With respect to your discussion about the patent rights with respect to atomic energy, we almost had a full-blown filibuster in the U. S. Senate, and the question there was the extent to which private firms would be permitted to secure patents on atomic power. My impression was that atomic power was developed by the Government, at least up to a few years ago, on the basis whereby the Government did take title to all of the patentable rights in atomic power; is that not correct?

Mr. HAMBERG. Yes.

Senator LONG. If anyone develops a successful atomic motor for an automobile or an airplane, on which he had a patent, he would

be in a very advantageous position for a long time to come, would he not?

Mr. HAMBERG. That is true. But in some cases no more powerful a position than some of the firms now are in as a result of the patent rights they get, let us say, from Defense Department contracts.

It is a question of degree, and probably, in view of the difficulties in the development of atomic applications or the application of atomic energy, industrial applications, the monopoly position might be more powerful, but still it is a matter of degree.

There are many powerful positions that have been erected on the basis of patent rights retained under present practices.

Let me point out that a Government, confronted with the threat of outright refusal to perform R. & D. without these patent rights or the threat of being forced to pay much higher costs, has alternatives.

It could use, for example, the so-called arsenal approach, that is to say, it could conduct R. & D. within the Government sector itself, and I would hazard a guess that this would likely be cheaper.

It is already done, of course, to a considerable extent. The Government does perform R. & D. within its own laboratories.

I see no reason, in principle, and I can see many advantages, for opposing this practice. First of all, the most decisive advantage is that it gets around the whole problem of patent rights itself, and I would say, therefore, permits—any Government-performed R. & D. permits—inherently a more rapid diffusion of technological knowledge than would otherwise be the case.

I would also guess that the so-called arsenal approach—that is the direct conduct of research within the Government sector itself—would be cheaper.

If we are looking for ways of making Government expenditures on R. & D. lower, one of the most significant ways would be to perform such research and development within the Government sector itself, within Government laboratories.

For one thing, there are some firms that are so heavily dependent on R. & D. Government contract, for example, in the aircraft industry, where we have 84 percent of R. & D. which is financed by the Government; 54 percent of R. & D. in the electrical equipment industry is financed by the Government; 52 percent in telecommunications and broadcasting industry; 45 percent in the scientific-instrument industries.

Just imagine what would happen if the Government threatened to withdraw, while we are bargaining about costs of R. & D., imagine what would happen if the Government withdrew all its outlays in such industries.

I daresay in some of them, if their R. & D. programs would not collapse completely, they would come very close to it.

The Government has powerful bargaining weapons in many instances and, furthermore, it would stop this almost silly process of financing its own shortages of scientific personnel.

The private corporation frequently includes in its bid the costs of acquiring more personnel, and the personnel frequently come from Government laboratories. They bid up their wages and salaries to get them away from there, and then the Government pays for this.

If the Government performed it within its own sector, within its own laboratories, this crudely expensive process would be avoided.

I daresay there would be a lot of unemployment in these R. & D. laboratories in the private corporations were the Government to withdraw its contracts, and the Government could then employ this personnel at savings to itself, savings, I might add, that offer a more fruitful path than the alternative of compelling some kind of a license payment to the Government, like the British system, because in this case you would have none of the disadvantages of the patent system, that is, knowledge developed in Government laboratories becomes immediately available and in the public domain, whereas in the British system that is not true.

There is just a license fee that is paid to the Government, but the substantial disadvantages of the patent system continue to hold.

Here it would not be true, and yet the Government would also be saving, I daresay, by having to pay lower costs for R. & D. as a result of conceivably lower salary payments in the——

Senator LONG. Would it not stand to reason in that event, though, Professor Hamberg, that the research and development personnel that the Government would gain from private industry would be the least competent in private industry?

Would it not be reasonable to assume that private industry would seek to hold on to its best personnel, which are paid higher prices than the Government can pay, and turn loose the least competent personnel?

Mr. HAMBERG. I do not think that necessarily follows at all, Senator.

In some of these industries, for one thing, if the Government withdrew its contracts there would be such a huge volume of personnel released that I am sure that we could count on highly competent personnel to be included in that group.

Secondly, remember, that one reason why—certainly a reason, although not the only reason—that private corporations are enabled to pay as high salaries as they do for their personnel is that the Government is financing it.

Withdraw that Government financing, and you reduce, at least, although you certainly do not eliminate, some of that ability to pay these rather fantastic salaries.

Senator LONG. In other words, maybe these high salaries are paid because the Government has been paying the entire salary, plus a fee on top of that.

Mr. HAMBERG. Unquestionably.

Senator LONG. Yes.

Mr. HAMBERG. I might add, if you will allow me, that, in part, these high salaries, of course, are engendered not merely by the competing away of scientific personnel from the Government sector, but the competing away of scientific personnel from other firms and universities within the private sector by the firms performing R. & D. at Government expense. So that there are all sorts of ramifications by which the high salaries for these scientific personnel are partly financed by the Government's outlays.

You see, you not only have a reallocation of scientific resources from the Government sector, but you have it within the private sector, from

firms not performing R. & D. at Government-contract expense to firms doing so.

Senator LONG. Let me ask you this question: In addition to the information that you have provided here with regard to the percentage of research and development paid for by the Government in certain selected industries, do you have the percentage in a number of other industries? I would like to have such information.

Mr. HAMBERG. I do not have it available.

Senator LONG. Could you provide it to amplify your statement?

Mr. HAMBERG. Yes; I think so.

Senator LONG. I would like for you to do that.[1a]

Perhaps you do know offhand the percentage of Federal money that is spent on research and development in the petroleum industry. I would be curious to know about that.

Mr. HAMBERG. The petroleum and the chemical industries are two of the—there are only about two or three industries, I cannot think of the third, there may be a third—but in any event, in the chemical and in the petroleum industries you have the exception to the rule. These are two industries where the bulk of R. & D. is financed by the firms themselves.

Senator LONG. My impression is that in those particular industries about 98 percent of the research and development is financed privately by the industries.

Mr. HAMBERG. I do not know the exact figures, but the impression anyway given by that figure is undoubtedly correct.

Senator LONG. I would imagine in those particular industries that if you were requesting them to forego their patent rights they would just prefer to put up that extra 2 percent themselves and go ahead and do the research without any Government contract.

Mr. HAMBERG. That may be, and then I would suggest if the Government cannot get it in private industry it should do it itself.

Senator LONG. I imagine it probably would.

What do you think of the argument that is evidenced by this type of statement I have seen: "Destroy the ability to establish the proprietary position in any field, and you will find higher mortality rates in all fields."

Mr. HAMBERG. Destroy the proprietary rights——

Senator LONG. The proprietary position in any field, and you will find higher mortality rates in all fields.

What do you think of that statement?

Mr. GORDON. I think the meaning of proprietary position in this case is monopoly position.

What it means, I think, is that if you destroy the ability to acquire a monopoly position in any particular field, you will find high mortality rates in all fields.

How does that sound to you? Does that sound reasonable?

Mr. HAMBERG. Not at all.

Frankly, the latter part of the statement sounds like a perfect non sequitur, and the entire statement is a denial of the competitive advantages of a free-enterprise system. I would contest such a statement from start to end bitterly.

[1a] See prepared statement, p. 17. See also app. I, p. 397, for statement presented by Professor Hamberg to the Joint Economic Committee in connection with the committee's study of employment, growth, and price levels.

Let me also emphasize, we should not overlook what I pointed out in my opening statement, that there are other very important advantages to performing contract work for the Government that exist quite apart from the patent rights, and in view of the fact that, as a general proposition, some of these advantages obtain in the patent system at large completely apart from the question of the Government's role in this picture, I myself believe that we strongly exaggerate the benefits of the patent system as such.

There are decisive advantages that exist apart from patent rights, such as the know-how that firms can acquire and do acquire, in the process of performing research and development.

This information is frequently not patentable, and even when it is, firms frequently withhold it, even while filing patent applications.

This know-how unquestionably, we have seen in many, many experiences, gives the firms decisive advantages that exist quite apart from their patent rights.

It gives them a headstart, and now if we apply that to the Government-contract case, I do not think we should underestimate these advantages that would continue to exist, quite apart from the withdrawal of the patent privileges, and such advantages, I am convinced in my own mind, are decisive enough or are strong enough to induce these firms to continue to permit the Government to bear the R. & D. costs while they continue to retain the know-how, and the advantages that would enable them to market products commercially well in advance of competitors.

Senator LONG. Here is a another statement I have recently seen: "One contract from Defense will not provide compensation for taking all the inventiveness of a contract."

Mr. HAMBERG. Taking what?

Senator LONG. For taking all the inventiveness of a contract. It is no compensation for the background, talent, plant, and facilities that made the invention possible.

Mr. HAMBERG. This question may involve us in some accounting problems.

When a firm estimates its costs, it seems to me, unquestionably—well, it is a fact in Government contracts that they are given an allowance for overhead.

Now, overhead can include the use of research and development facilities that they have acquired at their own expense, so that part of the costs of recovering these expenditures is borne by the Government.

The same is true, presumably, of the use of scientific personnel and, in fact, as I pointed out, the contracting firm is frequently enabled to acquire more scientific personnel than it otherwise would in the absence of the Government R. & D. contract. It seems to me almost too obvious to bear emphasizing like this.

Senator LONG. As I understand it, then, you feel that, if need be, it would be better to pay more for the research and development rather than pay the hidden costs that are inherent in granting one firm a monopoly. By permitting one firm to impede everybody else from producing something is certainly a hidden cost to the economy.

Mr. HAMBERG. Absolutely.

Every policy, every practice, has a cost. Now, it is just a question for us to decide which bear the higher costs.

Senator LONG. That is all I have.

Mr. GORDON. I have a couple of other choice statments which will be said during the course of our hearings, and I would like to get your brief comments on them.

Here is one quotation:

If industry lost its hope of the commercial market through a requirement that title to the inventions from Government work be vested in the Government, our ability to secure the services of qualified and competent firms would be impaired.

Mr. HAMBERG. Well, of course, that first proviso is a big one: "If they lost their rights to a commercial market." This I deny.

Mr. GORDON. Professor Hamberg, the Senator and I just submitted some quotations to you for your comments. Do you detect a common note running through all these statements, a distrust and fear of the competitive process?

Mr. HAMBERG. I would certainly say so, absolutely.

But while that is certainly true, I do not think there is any doubt that—I think the point is that a contracting firm with or without patent rights has a certain monopolistic advantage.

It has it in the know-how, in being 10 steps ahead of its potential competitors. It gets a headstart.

This know-how is invaluable. It exists quite apart from the patent rights and, therefore, I deny that any substantial commercial rights or privileges are lost as a result of the loss of withdrawal of the patent rights.

Mr. GORDON. Professor Hamberg, do you think there is anything in the view that our low rate of progress is due partly to our lack of desire to compete?

Mr. HAMBERG. Well, that is a rather broad question. I do not know what low rate of progress you have in mind. The low rate of progress in the last couple of years?

Mr. GORDON. I would say that.

Mr. HAMBERG. But I think we should be very cautious about generalizing from that.

There are a huge number of factors that enter into economic and technological progress.

It is true that for the last 5 or 6 years the rate of growth of output per man-hour, at least in the manufacturing sector, has been below its longrun trends.

On the other hand, in the period of about 1947–53 it was substantially above its longrun trends.

Ostensibly there was no—there were no basic institutional changes that might explain the sudden drop in the growth in productivity between those two periods.

In any event, I would be hesitant to draw any generalizations from the limited experience we have had in the last 4 or 5 years.

Mr. GORDON. Another problem we are concerned with here is the acquisition and dissemination of technical and scientific knowledge, especially that resulting from Government-sponsored research.

Would you say that the acquisition and dissemination of scientific knowledge is absolutely essential to increasing productivity and accelerating the rate of growth?

Mr. HAMBERG. The answer to that seems to me rather self-evident. Absolutely yes.

Mr. GORDON. Would you say that because the Government sponsors more than half of all industrial research, it has a special responsibility to see that whatever knowledge is acquired is made available to our society?

Mr. HAMBERG. Absolutely. This point has been stated before; I have tried to put the same point in a slightly different framework. I have it in my opening statement.

We are faced with the unconscionable situation in which the Federal Government taxes the citizens of this country to secure funds for scientific research on the ground that such research promotes the general welfare, and then turns the results of such research over to a private corporation on an exclusive monopoly basis.

This amounts to public taxation for private privilege, a policy that is clearly in violation of any of the basic tenets of democracy.

Mr. GORDON. I know you have said it in one way or another, but I am trying to point these things up.

Mr. HAMBERG. Absolutely. But I think the argument should be put on firm grounds, and this is what I have tried to do.

The alleged basic economic principle for a patent system is the risk principle, an inventive principle that firms bear risks in laying out their own funds for invention and innovation.

There are enormous risks associated with these processes; therefore, they should be granted a monopoly privilege in the form of a patent right as an incentive to undertake these risks. This is the principle of a patent system. This is the principle for granting patent rights.

Now, in the present case the firms do not bear any of these financial risks. Therefore, the principle does not apply.

That seems to be the nub of the issue.

Senator LONG. Actually, isn't that basically the same problem that exists when that contractor hires somebody to do the work for him? He pays them to do the research. What they find in his.

Mr. HAMBERG. That is right. That is a good point, Senator.

Senator LONG. Now, when the Government pays him, what he finds would seem logically to belong to the Government.

Mr. HAMBERG. That is an excellent point, Senator, because it is quite true when R. & D. contracts are sublet to other corporations by a private corporation, the larger corporation that finances the subcontract retains full patent rights.

If it holds in that case there is no reason why another financing unit called Government should not also retain the patent rights.

It is pure double talk to argue that it is correct for one but not correct for the other.

Mr. GORDON. Professor Hamberg, I have a couple of more questions here. This is really putting the same point in another way.

Would you say that any policies or practices which hamper the acquisition of scientific and technical knowledge and its diffusion are, therefore, retarding the rate of our growth?

Mr. HAMBERG. Yes.

Mr. GORDON. In your opinion, could the relatively slow rate of growth be attributed, at least partly, to the present Government policies and practices?

Mr. HAMBERG. Well, I refuse to—I think that is too broad a question to answer.

I would say that in view of the fact that before 1953 we had a very high rapid rate of growth for about a half dozen years, well above the historical average, and the practice of, the Government contract practices, were the same then as now, this institutional feature of the situation has not changed and, therefore, I am inclined to say that it is probably for other reasons that the rate of growth has slowed down.

Nevertheless, I would say that insofar as the governmental policies have—this particular Government policy has prevailed, let us say, from the period 1947 to 1953, and from 1953 to 1959; in both cases for the whole period, the whole 12-year period, let us say, the practice has had the effect of retarding economic growth, of slowing down the potential rate of economic growth, because ipso facto a patent right has this effect.

Senator LONG. Here is a statement, I believe, you might want to correct, a statement that you made, Professor.

I think our thinking was parallel, but I think you were, perhaps, in error when you stated that—

> It is my impression that commercial rights to inventions made by the subcontractor are usually retained by that subcontractor.

Mr. HAMBERG. No, no; by the firm that lets the subcontract.

Senator LONG. I would imagine that it would depend upon the company. Some companies probably insist on retaining any patent rights that a subcontractor comes across and others do not.

But I do have, I have seen, at least one statement where a company clearly spells out their policy which is to permit the subcontractor to retain any patent rights that he develops.

Mr. HAMBERG. I would say my impression would be that would be the exception to the general case.

Senator LONG. Perhaps that is so.

Mr. HAMBERG. In general, subject to some exceptions a private corporation that lets contracts to other firms for R. & D. retains the patent rights.

Senator LONG. I believe it is correct. I believe that my statement is completely true, that any corporation that hires any scientist or research personnel to work in their laboratories, certainly would insist that they would have any patent rights that this person would develop working in the laboratory.

I think that much would be incontestable, would it not?

Mr. HAMBERG. Yes.

Senator, it seems to me that we are indulging, to a certain extent, in needless speculation. It would seem to me, and I would recommend, that the committee investigate the costs of R. & D. by the Atomic Energy Commission, let us say, with the costs of R. & D. from the Defense Department.

Here we have, we already have, and I would guess that the Atomic Energy Commission's contracts run in the neighborhood of a minimum of $300 million a year, that is a minimum—this is a substantial amount, I would suggest and, therefore, we have an important case where contracts are let by an agency that does retain the patent rights and we, therefore, have the basis for making an outright statistical comparison of, let us say, the costs to the Government agency of R. & D. contracts where that agency retains rights, and the costs of

R. & D. to another agency where that agency permits the contractor to retain the patent rights.

It seems to me the committee ought to make a statistical study, so far as that is possible, of the relative costs in these two situations.

I have not heard, incidentally, it has not been brought to my attention on any widespread basis, that the Atomic Energy Commission is confronted with significant refusals by private corporations to perform research for them, even though the private corporations do not retain the rights.

I might also add that there are a sufficient number of cases wherein corporations agree to do R. & D. work for the Government at the Government's expense only when the research and development involved is relevant to technical and, therefore, commercial problems already confronting the firm.

What I mean to say is that in many cases these firms turn down Government R. & D. contracts, even with the patent rights, because the research and development involved does not have any clear relevance to their present problems, let us say, and interests.

The mere granting of patent rights is no guarantee that these firms will jump at these contracts, and from the AEC experience, the Atomic Energy Commission's experience, clearly the retainment of patent rights by a Government agency is no indication that the contracting firms will refuse to perform R. & D.

Senator LONG. Would you, in addition to what you have provided for us here, and the information that I asked about as to the percentage of Government expenditures in other fields for research and development, would you be so kind as to supply for our committee files the various works and writings you have done in this field, Dr. Hamberg?

Mr. HAMBERG. Yes. I just presented a paper at the end of September to the Joint Economic Committee.

Mr. GORDON. Could you submit that for the record?

Mr. HAMBERG. Yes, I can have a copy for you.[2]

Senator LONG. Thank you very much, Dr. Hamberg, for your testimony here this morning.

Mr. HAMBERG. I was glad to be of help, Senator.

(The prepared statement of Mr. Hamberg follows:)

GOVERNMENT PATENT POLICIES AND GOVERNMENT-FINANCED R. & D.

Prepared statement of Daniel Hamberg, University of Maryland

The Senate Small Business Committee is to be warmly congratulated for its investigation of the patent policies of Federal agencies. Especially crying for study is the policy of virtually all Federal agencies (with the exception, I believe, of the Atomic Energy Commission, the Department of Agriculture, and the Tennessee Valley Authority) of permitting private corporations to secure patent rights to inventions developed by the corporations under Federal financial sponsorship. This policy possesses all the inherent and potential disadvantages of the patent system and none of the latter's alleged advantages.

Whatever their merits, it is undeniable that patent rights confer monopoly powers on the patentee. Patents enable their owners to restrict the use of inventions, thereby restricting the contributions to the national product that the patented inventions could make, in the hope that the resulting higher market prices will make possible (monopoly) profits in excess of what could be earned

[2] See app. I, p.397.

under competitive conditions. To deny this feature of the patent system would be tantamount to denial of any usefulness of the patent system.

Implicit in this essential characteristics of the patent system is a retardation in the rate of diffusion of inventions. Why has society erected a legal institution that impedes the diffusion of technological knowledge? The answer lies in the belief that the monopoly profits made possible (if not guaranteed) by the patent system will act as an inducement to further, and even raise the rate of, invention and innovation. In a word, the patent system was conceived in the paradoxical expectation that by slowing down the rate of diffusion of inventions, there will be more inventions to diffuse.

The mental route by which this conclusion has been reached should be familiar to all. It is first of all assumed that economic progress is desirable. Secondly, it is assumed that economic progress rests essentially on technological progress, the development of new processes and products. Thirdly, it is assumed that technological progress rests in the main on inventions and innovations (the industrial exploitation of inventions) that are patentable. Invention and innovation involve often much time and effort and frequently heavy financial outlays. This is particularly true of the postinventive stage, because costly development work, experimentation in production and in marketing may be needed before the commercial exploitation of the invention can begin. The risks involved may be too great to be undertaken unless the shelter of a patent is granted. It is assumed that the profits that would accrue from the exploitation of inventions under competitive conditions would not be sufficient to induce inventors and innovators to undertake these risks. Hence, to provide inventors and their financial backers with sufficient incentive to undertake the risks associated with invention and innovation, it is necessary to hold out the prospect of monopoly profits.

I believe that the foregoing can safely be said to embody the essentials of the modern case for the granting of patent privileges. It will be seen to be basically an "incentive" argument. The profit expectations connected with the hope for a patent monopoly may induce inventors to exert their inventive efforts, or in the modern scheme, induce corporations to maintain expert staffs of scientists and engineers and expensive research laboratories; the same profit prospects may induce venturesome capitalists, or their modern counterparts, the great corporations, to risk their money on uncertain and expensive development projects and pilot plants, and on the equally uncertainty-laden tasks of building up markets. It may be granted that patent-monopoly profits stem from output restrictions, and are thus inherently associated with underutilization of a recently developed piece of technology. But it is argued that this is the price we must pay for a system that fosters the development of new technologies and thereby ultimately permits a more rapid growth in total production than would be possible in its absence.

Without pausing to examine the validity of this argument, and there are many grounds for questioning it, let us scrutinize its applicability to the case of Government-financed research carried on in the private sector of the economy. Perhaps the most notable feature of such activity is the total absence of all financial risk on the part of firms conducting the research and development. Virtually all R. & D. contracts let by Federal agencies and departments are on one sort of cost-plus basis or another. No results are guaranteed, nor can they be, of course. But no matter how difficult or expensive a project turns out to be, the costs are covered by the Government. The contracting firms pays not 1 cent from its own pockets. Not only is it remunerated for the basic invention for which it is responsible, but the Government bears all the costs of development work attached to it. Furthermore, there is no market to be developed. The market is there, waiting eagerly, in the form of the Federal agency or department for whom the R. & D. has been performed. In short, the whole thing is virtually a riskless venture for the contracting corporation. If there is a possible risk, it is that of contract cancellation. But even this can hardly be described as a risk, for it remains true that the firms have invested none of their own funds, and are always granted a return well in excess of costs to boot.

What becomes of the "incentive" argument in this case? The answer, of course, is that it collapses completely. If there are no risks, there is no justification for a monopoly profit such as might accrue from patent rights. But since the patent rights are clearly not needed to serve as an inducement to invent an innovate, while they simulateously impede the diffusion of technological knowledge uncovered at public expense, the granting of patent privi-

leges to the contracting firms clearly gives society none of the alleged advantages of the patent system while foisting upon us one of its decisive disadvantages.

In short, we are faced with the unconscionable situation in which the Federal Government taxes the citizens of this country to secure funds for scientific research, on the grounds that such research promotes the general welfare, and then turns the results of such research over to some private corporation on an exclusive, monopoly basis. This amounts to public taxation for private privilege, a policy that is clearly in violation of the basic tenets of any democracy. Such a violation might possibly be justified on the grounds that it leads to greater enhancement of the general welfare than adherence to a basic principle would; but in the present case, no offsetting gains are in the offing. Under the circumstances, it seems palpably evident that new discoveries derived from research supported by public funds belong to the people and constitute a part of the public domain to which all citizens should have access on terms of equality.

Lest the committee infer that the withdrawal of patent privileges from firms performing R. & D. for the Government at the latter's expense will remove all competitive advantage accruing to such firms, let me hasten to caution against any such inference. There are inherent advantages in performing such work that exist quite apart from patent privileges. (1) Many technological developments resulting from Government-financed R. & D. have direct and immediate commercial applications. In recent years, the application of radioisotopes, the drive toward competitively priced atomic power, jet propulsion, cold sterilization of food by radiation, the formulation and fabrication of titanium and magnesium and other heat and corrosion-resistant metals and alloys, etc., are all examples of such commercial applications. As a result of research financed largely by the Federal Government during World War II, technological developments appeared in the form of new materials such as synthetic rubber, aviation gasoline, plastics, and plywood; new methods such as metal riveting and welding, heat-treating procedures, power metallurgy, and casting; and new products such as aircraft design, gas turbines, radar, DDT, and the electron microscope.

Thus the independent commercial contractor, performing R. & D. for the Government, receives in addition to costs and fees all the financial advantages of the commercial applications of inventions, the research for which has been paid almost entirely out of Federal funds. In a considerable number of cases, firms will take R. & D. contracts only when the research and development is relevant to technical (and hence, commercial) problems already confronting them. The result is, again, that although the firm may provide the Government with the sought-for "product," the firm in the meantime gets its R. & D. costs financed at public expense.

(2) A second (nonpatent) advantage associated with the performance of Government-financed R. & D. work is the enhanced ability of the performing firms to acquire scientfic and technical personnel. The most obvious way of course, is via the increased size of R. & D. budgets that such work permits, including allowances for personnel that can be charged off to the Government. In addition, recruiting costs can be charged to overhead costs and are reimbursable in the case of Defense Department contracts. Also, with so much Government R. & D. work standing at the periphery of existing knowledge, the firms can often hold forth the promse of interesting and challenging work.

(3) At least as important as the preceding two advantages is a third one. The performing firm ipso facto acquires a considerable body of information relating to the invention, information that may be unpatentable but possession of which is often indispensable to the proper use of the invention. This information is known colloquially as know-how. In the case of a new product or material, this know-how includes the relevant experience accumulated in the early stages of production, during which many minor modifications may be made in the design or production process. Similarly, invaluable information is often accumulated during the trial runs or pilot-plant testings of new processes. Such information is typically unpublished and remains as confidential information in the possession of the firm's operating personnel. The withdrawal of patent rights from firms performing R. & D. at Government expense would not and could not deprve them of this often priceless know-how.

This same point is also relevant to the roadblocks thrown in the path of diffusion of inventions protected by patent rights. Exponents of the patent system, and presumably these would include the corporations performing research for the Government, often argue that far from retarding the diffusion process,

patents speed it up by providing the information contaned in the patent itself. What is overlooked in this "exchange for secrets" argument for patents is the slipshod method of identifying inventions in the patent applications that make it possible to obtan patents without disclosing all the information that must be known to make use of the patented inventions. As noted above, restrictions on patentability sometimes limit the information relevant to a given design or process embodied in the patent. In other instances, however, managements prefer to withhold certain knowledge from public view, in any form, regardless of patentability. Where this is done the public does not receive the information that presumably partly justifies the grant of monopoly rights to the patentee. Instead, the patentee obtains the bargaining power attached to a legal monopoly and also continues to enjoy whatever bargaining strength he can derive from possession of a trade secret. These strictures apply without qualification to patent rights granted to private corporations on inventions financed by public funds.

It must also be remembered that the granting of patent rights involves a wastage of whatever resources competitors use to "invent around" the patent in order to enable them to compete with the patentee in the same market. Too, it is not uncommon for patentees to devote considerable resources to the quest for patentable alternative solutions, even inferior ones, in the hope of "fencing in" the original patent. It hardly becomes a National Government interested in promoting progress and growth to aid and abet in these resource-wasting activities by granting patent rights to firms performing research for it, especially when nothing is obtained that might offset these drawbacks.

Finally, although they are familiar to students of the patent system, it may be well for the record to catalog briefly some of the more important past abuses of patent privileges, so that the committee will once more be reminded, if indeed it needs to be, of the potential dangers inhering in the present patent policies of most Federal agencies and departments with respect to R. & D. performed for them. Although the nominal length of time of patent grants is 17 years in the United States, patentees have not infrequently succeeded in extending the time period of control through procedural delays in the pendency of the patent between application and issuance; through secret use of the invention prior to application or through incomplete disclosure, mentioned earlier; through supplemental patent improvements that make the unimproved invention commercially worthless after expiration of the original patent; through creation of a monopolistic market position based on the goodwill associated with a patented process or product, so that buyer loyalty continues after expiration of the patent; and through licensing agreements that extend beyond the original patent because they apply to a stream of patent improvements.

The scope of the patentee's monopolistic control has been extended beyond the patented invention to the control of entire industries by the acquisition of a basic patent; by an "umbrella" patent, where illegitimately broad and ambiguous claims covering an entire industry have been allowed; and by a "bottleneck" patent, which is not basic but good enough to hold up or close an entire industry. Because much of current research being performed for the Government, particularly defense-related research, is on the frontiers of existing knowledge, the possibilities of firms acquiring basic or bottleneck patents, and thereby acquiring monopolistic controls of "infant" industries or even industries not yet in being, are especially important today. These same considerations suggest that firms engaged in continuing research for the Government in a given field may also be enabled to employ the time-proven device of accumulating significant aggregations of patents to secure domination of entire industries. And where they are not responsible for all important inventions, their possession of certain crucial patents may force the holders of other patents to sell them, or else enter into cross-license agreements, which in the past have also provided the base for industry cartelization.

The foregoing are just some of the more important abuses of patent monopolies in the past. Some may be willing to argue that the incentives to invent and innovate that the patent system offers have more than offset these abuses; this is a moot question, and this is hardly the place to enter the debate. But it is worth reemphasizing that in view of the absence of risks associated with R. & D. performed for Government by private firms, no such claims can be made for patent rights that are permitted to revert to the firms. The granting of

patent rights to these firms continues to expose society to the various potential abuses just listed without providing us with any compensating advantages.

In concluding this statement, I should like to draw the committee's attention to one other problem created by the present pattern of the Government's research expenditures. Whether by design, or chance, or more likely, administrative expediency, Government R. & D. contracts have been let primarily to the giant corporations, to the virtual exclusion of small and medium-size firms. Of the 77 percent of total Government R. & D. contracts let by the Defense Department during fiscal 1956, only 6 percent were let to firms employing less than 500 persons. Of the 21 percent of total Government R. & D. contracts let by the Atomic Energy Commission during the fiscal years 1953, 1954, and 1955, only 1 percent were let to small firms. As we have noted above, either with or, in view of the commercial applications of Government-financed R. & D., the enhanced ability to secure scientific personnel, and the know-how that automatically accrues to the performing firms, even without patent rights, this practice automatically confers great competitive advantages on the giant firms vis-a-vis their smaller competitors, thereby promoting already extant monopolistic tendencies. The withdrawal of patent privileges from the giant firms would only moderate this effect; it would fall far short of eliminating it. The enhancement of monopolistic tendencies is an intrinsic characteristic of the present practice of concentrating R. & D. contracts in the hands of the giant corporations. (For the 5 years ended June 30, 1956, of 6,788 pending patent applications that resulted from Government-sponsored R. & D. work, 52 percent belonged to 15 large companies.)

The committee would therefore do well to look into ways of getting Federal agencies and departments to distribute R. & D. contracts on a very much broader basis than is now done—in the interests of fostering more competition in the economy generally and, more specifically, in the new industries arising under the spur of new discoveries associated with R. & D. financed with Federal funds. One suggested way that warrants serious consideration is a reduction in the broad responsibilities of the contracting officers. With the terrific responsibilities under which the latter now operate, they tend to shy away from relatively unknown small firms and rely, instead, on the well-known large firms. For then if anything goes wrong, it is much easier for them to disclaim responsibility than would be the case were they to let contracts to small firms. It has been proposed that advisory review boards be set up to help the contracting officers make their decisions and advise whether a contract could feasibly be awarded to a small firm.

Another suggested way of spreading R. & D. contracts is to substitute a fixed-fee contract for the present cost-plus type of contract. The reason for this suggested change is that too often a small firm cannot make anything from the present 7–12 percent or so fee range on the cost-plus contracts, because they may be able to put only 5 to 10 or so men at work on the contract compared to the hundreds that large firms can often put on it; the cost base is thus much larger for the larger than the smaller firm. But this does not mean that the large firm will necessarily do a better job. Usually, one or two very able men spark a project with the rest largely "hanging around." Quite frequently, a project could be carried out just as well and quickly by small firms with their small teams and fewer "hangers-on." It is also apparently common practice for the large companies to put their least able men on Government contracts because of the cost-plus nature of the latter. It has come to my attention that many small firms would feel much freer to bid on Government R. & D. contracts, with full guarantees of performance, if they could bid on a fixed-fee instead of the present cost-plus basis. They seem to feel that in many cases, with the altered bid basis, they could significantly underbid the large firms without any impairment of results.

In any event, it is clear that achievement of the committee's announced goals and objectives of encouraging small business and promoting more competition requires not only the withdrawal of patent rights from firms performing R. & D. at Government expense, but no less important, a considerable broadening of access of small and medium-size firms to Government R. & D. contracts.

Senator LONG. The next witness will be Mr. Louis A. Peirez, of Viewlex Corp.

We are pleased to welcome you here today.

STATEMENT OF LOUIS A. PEIREZ, PRESIDENT, VIEWLEX, INC., LONG ISLAND CITY, N.Y.

Senator LONG. What is your capacity with the Viewlex Corp?

Mr. PEIREZ. Thank you. I am president, sir.

Senator LONG. Do you think you could summarize your statement, Mr. Peirez?

Mr. PEIREZ. I will try to. I did not prepare a summarized statement. I was under the impression——

Senator LONG. If you cannot summarize it, you might just as well go ahead and read it.

You might find it profitable to leave out one or two points in there that might not be as important as the rest of it, but if you cannot summarize it, you just go ahead and read your statement.

Mr. PEIREZ. Well, I might add this, that the reason that I am here today is because we initially had an item to take up, and still have, with the Small Business Administration, on the question of what is and what is not small business, and apparently some of our statements led to your committee asking us to send you our statement.

Senator LONG. You have a very significant statement here, Mr. Peirez, and you just go ahead and present your statement in your own fashion.

Mr. PEIREZ. Well, I was going to say this: In our experience we have run into what substantially corroborates what Professor Hamberg has just said.

For example, we are in the photographic business, and the lens situation is one that was pretty tightly controlled in Germany, and immediately after the last war all of the information on lenses and other such photographic items were brought over here.

During the following 4 or 5 years up to the Korean situation, it was evident that there was not enough lens knowledge available here, and the Government, and in our opinion, rightly so, issued what I think was called stand-by contracts for lenses, and at considerable cost the lens business was developed for aerial cameras, aerial photography, which is reconnaissance and mapping, and it is obvious that is highly limited to Government use.

As we bid on these items we were told that such information was available, and we assumed that it would be made available, but we found it almost impossible to obtain it.

As I said in my statement, and I did not know of this until some two weeks or so ago, in the early 1950's, when we looked into it, we had correspondence, and as recently as 1954 we had a contract that ran about $2 million, of which more than one-third was for lenses.

We found that the cost of the lenses, despite all of this development, was such that it was just impossible to get them specifically from Eastman Kodak and, as a result, we wound up with Wollensak, and Wollensak has paid a license fee on the identical lens which was developed under the Government contract.

Now, Eastman Kodak does not in any way say this is not so. They say that the lens was developed, and it was paid for by the Government, that they have the tooling for it; that the tooling is available, and if the Government will release authority they will use the tooling.

Then they surround it with a number of other conditions, so that by the time you have the answers you are far better off paying the price to Wollensak, plus the royalty on it, and getting it over with.

That is one example.

Senator LONG. Let me see if I get this straight. The Eastman Kodak Co. had the information that is necessary to manufacture the lens?

Mr. PEIREZ. That is true, sir.

Senator LONG. Eastman got the information, if I understand this correctly, based on the fact that they had a Government contract for research and development?

Mr. PEIREZ. That is true; and, in fairness to Eastman, I think Bausch & Lomb was another that had more or less——

Senator LONG. Eastman and Bausch & Lomb both had it?

Mr. PEIREZ. That is right, sir.

Senator LONG. As I understand it, you were trying to sell cameras?

Mr. PEIREZ. A complete camera.

Senator LONG. A complete camera; and you were trying to bid on a Government camera, a camera the Government wanted; is that correct?

Mr. PEIREZ. That is right; and specifically it had absolutely no use other than for Government use.

Senator LONG. Yes.

Do I understand you correctly that this camera would be useful to no one but the Government?

Mr. PEIREZ. To the best of my information, it has absolutely no value to anyone but the Government.

Senator LONG. Yes.

Then, in order for you to bid on it and provide this to the Government you would have to get the information about making the lens from Eastman Kodak Co. or Bausch & Lomb; is that correct?

Mr. PEIREZ. That is essentially correct.

Senator LONG. In order to get this the Government would ask them to provide it, and while they would technically comply, as a practical matter, you just could not get the information; is that right?

Mr. PEIREZ. That is right, sir.

Senator LONG. Not in time to fulfill your contract, at least?

Mr. PEIREZ. Not only not in time, but never within a reasonable cost.

Senator LONG. So, based on the time and cost factors it was cheaper for you to go ahead and pay someone to produce the lens for you who, in turn, would pay Eastman 7½ percent on that contract?

Mr. PEIREZ. That is exactly what happened, except for the percentage. I do not know the exact amount of percentage.

Now, the 7½ was in another instance, sir.

Senator LONG. Your statement uses the figure of 7½ percent.

Can we sum it up in this way: The U.S. Government paid Eastman to develop this information once. Having bought it the first time, the Government then proceeds to pay Eastman a second time because somewhere in your costs you have got to cover the royalty that is paid Eastman again when you get the lenses.

Mr. PEIREZ. That is absolutely correct.

Senator LONG. So, in effect, Eastman did this research for the Government, for which it got paid, and then sold the results back to the

Government indirectly—that very same knowledge it was paid to produce.

Mr. PEIREZ. That is what it amounts to.

Senator LONG. That is it practically.

What items do you produce, Mr. Peirez, in addition to cameras? Do you produce anything else?

Mr. PEIREZ. We produce projection equipment, cameras, and we did produce microfilm equipment. We do not any more. The microfilm equipment only, that is.

Senator LONG. How big is your company?

Mr. PEIREZ. About 140 to 160 people. It varies.

Senator LONG. About what would your annual sales run?

Mr. PEIREZ. I know what they are. May I give them to you in private, sir?

Senator LONG. Yes. We would be interested in knowing about how much your assets are, just roughly.

Mr. PEIREZ. Ours is a wholly owned private corporation. There is no stock. It is family, and our book value is slightly over $1 million.

Senator LONG. You produced primarily for the commercial market or for the Government?

Mr. PEIREZ. Primarily commercial, sir.

Our volume runs approximately, it will average in the past 7 or 8 years, 30, 35 percent Government, at most, and the balance is commercial.

Senator LONG. About 30 percent Government, you say?

Mr. PEIREZ. That is right, sir.

Senator LONG. And primarily with which agencies?

Mr. PEIREZ. For the past 6 to 8 years it has all been AMC, almost all, by virtue of the so-called unification program where the various agencies buy photographic equipment through AMC. In fairness to AMC, however, it should be stated that it acts mostly as a contracting agency for the end user. Incidentally, I would say, better than 90 percent of the end user in our case has been the Signal Corps, but the contracting agency, with one exception, has been AMC.

Senator LONG. Just for the record, what is AMC?

Mr. PEIREZ. Air Materiel Command.

Senator LONG. Do you also engage in research and development?

Mr. PEIREZ. To a limited extent.

Senator LONG. Any Government contracts for it?

Mr. PEIREZ. Yes, sir.

Senator LONG. Have you taken patent rights on Government contracts that you have had?

Mr. PEIREZ. In one or two instances, with the complete assignment to the Government.

Senator LONG. Let me ask you this: Did the Government offer to let you keep the patent rights or did you simply——

Mr. PEIREZ. My recollection is that we were supposed to disclose—in one contract we were supposed to disclose anything that we developed. This was with the Office of Naval Research.

We did, and they asked for certain papers which gave them the right to use it, and we gladly signed.

I know in two other instances we developed items, and I do not mean to sound that it was a gratuitous offer, but because we had made similar equipment some 10 years ago, and it was applicable, we gave the Government the right to use it on any equipment.

Senator LONG. As far as you are concerned, if you can get a research and development contract on something that you are interested in making or developing, do you have any objection to the Government's retaining the patent rights?

Mr. PEIREZ. Absolutely none.

Senator LONG. Do you have any objection in a research and development contract to the Government having the right to acquire any technical information or know-how that you might develop on those contracts?

Mr. PEIREZ. None.

As a matter of fact, it is my impression that they get it anyway. To our limited knowledge, each contract has required that drawings be furnished, that technical orders and manuals be furnished, that a complete description and disclosure of the technical know-how, where it was R. & D., be furnished, and we have always worked on the premise that this belongs to the Government since they have paid for it, exactly as we had with private industry, where we have taken contracts in private industry in the early years of our business, before we went into our own product, and it was clearly understood that what was developed belonged to the man who paid for it.

Senator LONG. Let me ask you this: Would you regard the situation as being fairly analogous to that where you hire a man in your business to do some research on something, with the understanding that those research rights are yours if he finds something?

Mr. PEIREZ. There is no question about that, sir. When we hire anyone in our engineering department he signs a statement that anything he makes, our patent attorneys prepared it, and I do not remember the exact words—that anything he develops belongs to the company.

Senator LONG. That is because your company paid for it?

Mr. PEIREZ. That is right, sir.

Senator LONG. Your feeling is if the Government is paying you for research, the Government's rights are about the same with you as yours with the man that you hire?

Mr. PEIREZ. That is right.

Senator LONG. Will you give me a little idea of just how these research contracts have been carried; how do they go about paying you for research?

I know they will pay you your costs, I assume. It is usually a cost-plus-fixed-fee, is it not?

Mr. PEIREZ. Ours is slightly peculiar.

In 1952 or 1953 we tried a cost-plus-fixed-fee, and we thereafter found that we could not handle cost-plus-fixed-fee because it interfered with our commercial operation. For accounting purposes you must, in short, obviously, keep a continuous and an accurate record of what goes into it.

It was impossible for us in a small company to divide it accurately enough. We carefully looked into the question of setting up what might be called a contract department, and we decided against it.

Thereafter, the few R. & D. contracts we had and, in fairness to the larger ones, I do not think this could work on the real heavy-dollar ones we negotiated, and at the conclusion of negotiations we either arrived at a fixed price or a so-called target ceiling.

The target in one case was $280,000, the ceiling was $340,000, which set a limit on the job of $340,000, set a target of $280,000, and gave the Government the right, of course, to audit the costs at all times and particularly so at completion of the job.

I do not know whether or not this would work in your real large contracts.

Senator LONG. But I am interested in that because that is, perhaps, one way that small business can do research for the Government, and if I understand you correctly, the type contract that you had here was one where you agreed to spend a certain amount of money, a minimum of a certain amount of money, on developing a certain product for the Government; is that correct?

Mr. PEIREZ. When you say spend money, do you mean our own?

Senator LONG. Yes.

Mr. PEIREZ. No. In all fairness, we estimated what we thought it would cost, and this is the price we submitted.

Senator LONG. You estimate that you would spend a certain amount of money which the Government would provide to develop a product.

Mr. PEIREZ. That is right, sir.

Senator LONG. Could there be any guarantee that you would successfully develop that product?

Mr. PEIREZ. Not in this R. & D. But the fact is that we did, and what we got out of it for the next 2 years is a complete jump on the rest of the field commercially in cooling projectors, because we are making them now.

Senator LONG. Is that a big advantage to you, quite apart from the patent rights?

Mr. PEIREZ. It is the only reason we take it, sir. We do not take it from an altruistic point of view. We take it because of the know-how. It is more than we could afford to spend.

Senator LONG. In other words, at the time you developed this new product, the Government pays the cost of your developing it, but if you want to go competing in private commercial markets, then you would have a headstart on other people.

Mr. PEIREZ. Quite a headstart.

Senator LONG. In manufacturing it, because you know all the problems that you got into in developing it?

Mr. PEIREZ. That is right. We had quite a problem.

Mr. ANSBERRY. Mr. Peirez, was this second type of contract which you took then a fixed-price contract where you agreed to do a certain amount of work for a certain amount of dollars?

Mr. PEIREZ. What do you mean by the second type?

Mr. ANSBERRY. Well, you mentioned that you originally had a cost-plus-fixed-fee contract, and because of accounting difficulties——

Mr. PEIREZ. Thereafter.

Mr. ANSBERRY. Then you had a second type of contract?

Mr. PEIREZ. That is called a redeterminable type.

Mr. ANSBERRY. How does that work? You fix a price for doing a given amount of research, fix a price within certain limits; is that the point?

Mr. PEIREZ. That is right.

Mr. ANSBERRY. In other words, you can submit that you actually found that it required more man-hours or more equipment or something, to get the maximum price of $340,000, which is the figure you mentioned?

Mr. PEIREZ. The ceiling. You cannot go over the ceiling.

Mr. ANSBERRY. I see.

If it costs less you would give the Government the benefit of the difference; is that right?

Mr. PEIREZ. That is right. You are required to submit a statement at the end of the contract showing your costs, and there is an audit.

Mr. ANSBERRY. How does this reduce your accounting problems as against a cost-plus-fixed-fee?

Mr. PEIREZ. Because at the start of the contract the audit agency involved comes down. They establish an allocation of rates. They set up a system that they feel is complete enough for them to audit.

For example, specifically they want to know all the materials that go in; they will allocate two or three executive salaries on a 20–80 percent basis, 20 percent to this contract and 80 percent to your general overhead, and so on.

They will establish a system that is not as accurate as cost-plus-fixed-fee but, in their opinion, accurate enough so that they can determine the costs.

Mr. ANSBERRY. I see.

Mr. GORDON. Mr. Peirez, I want to get more specific now. Was the KA–20 camera you mentioned developed by the Hycon Manufacturing Co. with Government funds? You mentioned this in your statement.

Mr. PEIREZ. Yes, sir; although there is a question on the part of Hycon. They claim that some portion of it was not developed on Government funds.

Mr. GORDON. You, however, believe it was?

Mr. PEIREZ. Our opinion is that it was. We proceeded on that basis. We bid on that basis.

When we were awarded the contract, we tried to get the information and were unable to.

I then spoke to the general manager. I can give you his name if you want it, vice president of Hycon, who then said that they want 7½ percent of the face amount of the contract, which was some $600,000 or $700,000.

Part of the contract—the valve was the item that Hycon claimed they had a proprietary interest in.

Mr. GORDON. You did not want the valve anyhow?

Mr. PEIREZ. The valve was one item the Government said did not meet their requirements, and had to be revised, but it would have been helpful to have the information.

We refused to pay the 7½ percent, and we would, in all honesty, have used the valve, if it were usable. But it was not.

We developed a valve long before the contract was finished. We turned the valve over to the Government, and it is now being used in other cameras, along with a drive that we developed and showed to Lear-Romec, who is now selling it to other camera users.

Mr. GORDON. Your production of this particular camera was in competition with the Hycon Co., was it not?

Mr. PEIREZ. They were making cameras at the same time we were; yes, sir.

Mr. GORDON. You were both competing?

Mr. PEIREZ. Yes, sir.

Mr. GORDON. You said in your statement that you were not able to secure the data needed to manufacture the camera. How long was this after the camera had been developed?

Mr. PEIREZ. Well, I know for a fact the camera had been in the field for at least 2 years, limited amounts of them. There was 80 some-odd in use.

We were unable to obtain one until after the award of the contract.

For the first 4 years of the life of this camera it was sole-sourced to Hycon.

We were attempting to bid on it for at least 2 years before we obtained the first request to bid, and this, incidentally, was on a negotiated basis.

Mr. GORDON. What efforts did you make to get the data? Where did you look?

Mr. PEIREZ. Well, we went to the agency that was responsible for the camera, the Signal Corps, at Fort Monmouth.

We knew that they were out at Huachuca; we had a man go out to Fort Huachuca, but were unable to get one.

We were unable to get any drawings. The drawings should have been available, but the contention was that Hycon still needed them, and those drawings that were available were not yet complete, and that they were not required to be furnished until the competion of the various R. & D. contracts.

Frankly, I think this was broken loose by the efforts of the Signal Corps personnel in Monmouth who brought a camera in from Huachuca and made it available at a briefing conference for 1 day to anyone who wanted to see it.

So we took three or four of our engineers down and studied it and made some pencil sketches and then began to submit bids on it, and finally the first bid came out, I think in 1957.

Senator LONG. Let me just ask you a question on that point. I am a lawyer trying a case against a corporation, and ordinarily I could just subpena their records and make them bring that stuff in and take a look at it to see what I wanted. Now, they call that a subpena duces tecum.

Do you understand that when you are trying to bid on something the Government wants and when the Government has paid for its development, a person trying to bid on it can get that information the same way a lawyer could get it if he was trying a lawsuit from someone?

Mr. PEIREZ. I am not a lawyer, and I do not know what a lawyer could do, but we could not get it nor could the Government get it.

As a matter of fact, both the lieutenant and the major involved in this contract tried to get it from Hycon, tried to convince Hycon that it belonged to the Government, and were unable to.

We had a very short date on this, because it is used in the missile program, so there was nothing to do but go ahead and make it without the information, regardless of whether we felt we were entitled to it.

We felt so strongly about it that we were just not going to pay the 7½ percent.

Senator LONG. About the best you were able to do was to get a look at the product you were supposed to manufacture?

Mr. PEIREZ. That is right, sir.

Mr. GORDON. Didn't Hycon take the position that certain items in the camera were proprietary?

Mr. PEIREZ. That is right.

Mr. GORDON. By proprietary, I presume they mean they own it, they are entitled to it; they may have patents on it; is that what it means?

Mr. PEIREZ. Hycon said they had patents on it. Our search disclosed that there were no patents out yet but, obviously, there are none as of 2 months ago. There may be patents pending, and there is no way of knowing, I mean, patents in the Patent Office waiting to be processed.

Mr. GORDON. Of course, we do not know either whether the patents applied for were upon items developed at Government expense, do we? These patents could be on items developed at Government expense or at their own expense.

Mr. PEIREZ. I do not know.

From the standpoint of common sense, and I am not digressing, in the case of Eastman Kodak, it is very difficult to say that the Government paid for that development in its entirety. It is obvious that I am trying to use this as an illustration.

You cannot buy know-how overnight or in 6 months or in a year, and there is no question that Kodak spends literally mlilions of dollars on research and development. It may very well be that there is a good contention on their part for holding some of this back, that all of their know-how, and so forth, went into it.

But in the case of Hycon and other such companies, in the first place, Hycon was organized in 1946. The reports that are available to us are extremely limited compared to those that are available to you, but the reports available to us disclose that of roughly $10 million a year volume, a slight 99 plus percent is Government work.

In addition there are some $3 million of V loans to Hycon.

This sounds like a tirade against Hycon, and I do not mean it so. It is rather simple and obvious, that this is all Government-financed projects. What else could it be?

Furthermore, who else wants a reconnaissance or mapping program?

Senator LONG. Reconnaissance what?

Mr. PEIREZ. Reconnaissance and/or mapping program. That is what these are developed for.

Senator LONG. In other words, the only consumer, then, is the Government; nobody else would be interested in buying it?

Mr. PEIREZ. I suppose there may be one or two aerial survey cameras sold, but I cannot see anybody pouring these millions of dollars into that type of camera. It was specifically developed for Government use, there is no question of it.

Senator LONG. Yes.

Mr. PEIREZ. That is why I say, I am merely trying to draw a parallel between two companies. One, there is obviously no question, and in the other it could be that there is a good basis for some protection.

Senator LONG. If you were negotiating a contract for the benefit of your stockholders for somebody to develop a camera which you would manufacture for use or produce, and some person had done something in that field before, wouldn't you try to drive the best bargain you could for your corporation and your stockholders and see if you could not make those people agree they would make available to you the information that they achieved from the contract, as well as information that they knew before they took the contract?

Mr. PEIREZ. Certainly, sir.

Senator LONG. It occurs to me that someone might go out and spend a half million dollars studying something or trying to see how a certain thing could be done, and then seek a contract for $5 million to go forward with the development.

You would certainly be interested in acquiring the rights to that for which you paid, plus that which the man already had when he signed the contract with you.

Mr. PEIREZ. I am sorry, I did not quite follow you.

Senator LONG. Do you see what I mean? I mean this: I will phrase the same question in a different way. Suppose you are sitting there trying to look after the U.S. Government, trying to make the best deal you can for the taxpayer, and here is some fellow who spent $100,000 trying to develop a camera. He wants the contract with you for $1 million on which he hopes to make a $100,000 to go forward to develop that which he has been working on.

Now, if you are trying to get the best deal for the Government, would you be interested in acquiring what he already knows, plus that which he learned with your money or would you be disposed to tell him that he did not have to release anything that he knew already in return for the $1 million you are going to pay?

Mr. PEIREZ. That is—I mean, if I were working for the Government——

Senator LONG. Yes.

Mr. PEIREZ. I have never worked for the Government; I don't know how to answer that.

I can answer it if I were negotiating for our own company.

Senator LONG. How would you do it?

Mr. PEIREZ. Obviously, I would try to get all I could for my company. But I would recognize that the man had invested $100,000, using your figures, of his own money, and he is entitled to some protection on that.

I would feel though that for the other $900,000, that anything that came out in the way of a development we were entitled to enjoy that, certainly at least jointly with him, if not exclusively.

Senator LONG. If you were negotiating for your company, and you had the experience, just once, of having paid a considerable amount of money, and after you got through paying, you could not get the information on how to manufacture the product, because the man said that some of this had been developed with his own private money, would you let yourself be caught in that position again on one of those contracts?

Mr. PEIREZ. Not if I could avoid it.

Senator LONG. Don't you imagine that the next time you negotiate the contract you would say, "No, look, if you know something already

and if you want to sign this contract, include in the price of the contract what you hope to get for what you have already developed, because I want to know all the information you have developed by the time you get through with this contract"——

Mr. PEIREZ. I most certainly would. But let us go a shade further and be more realistic.

When two people are bidding, the one that has the know-how has a terrific advantage, and I will say openly that when we bid on anything, and we know we have the know-how, we take into account how much of that we can get paid for.

I do not know whether this is the wrong thing to say or heresy or anything else, but I will tell you point blank when we bid on these cameras or anything else, we take into account what we have already bought, the know-how we have got, the equipment we have got in the place.

Specifically recently we built soundproof rooms for testing equipment, and we also put in complete humidity equipment. We know now we do not have to go outside any longer to buy that.

For a small company that it not usual. The large companies have already got this, and we put into our bid just about what it costs us normally to go to laboratories to get this, and in that way we write our equipment off that much faster.

I do not know whether this is what you want to know or not, but I think any businessman would do it. I think any businessman knowing that he has an edge on his competitor would take this into account and add some part of it into his costs.

Mr. GORDON. As I understand it, then, your know-how and your background are figured into the price you charge for research and development work?

Mr. PEIREZ. That is correct.

Mr. GORDON. You say that various personnel made serious efforts to induce Hycon to produce the information. Did they regard those items, as Hycon claimed, to be proprietary?

Mr. PEIREZ. No, they did not. As a matter of fact, they would not have felt that they had a right to get Hycon to give either the information, the drawings, or the valve if they did not feel that way. They felt rather strongly about it.

Mr. GORDON. Were those items specified as being proprietary in any specifications you might have seen?

Mr. PEIREZ. No. As a matter of fact, this was the surprising thing all around. When the question of proprietary rights came up after an award, and this proved embarrassing to the ones involved in the contract, they did not know there were any proprietary rights, they did not feel there were any, either.

Mr. GORDON. Hycon wanted a 7½ percent royalty on exactly what, on the camera, or on the valve?

Mr. PEIREZ. No. The valve cost was approximately $30; the camera cost was approximately $1,800.

They wanted the 7½ percent of the face amount of the contract, which was between $600,000 and $700,000.

Mr. GORDON. Even though according to them, their proprietary item was the valve, not the whole camera?

Mr. PEIREZ. That was Hycon's position.

Senator LONG. Did the valve work?

Mr. PEIREZ. No, sir. The specification distinctly spelled out that the valve was not acceptable and had to be modified.

Senator LONG. Then these fellows wanted a fee on the entire product based on a part on which they had done research which would not work, if I understand it?

Mr. PEIREZ. Well, in fairness to Hycon, let us say the modification to the valve in Hycon's opinion probably was that it was a minor modification.

The fact remains though that they wanted 7½ percent on the face amount, and even assuming the valve to have been in good order, they wanted 7½ percent of $1,800, where the item involved was just $30.

Senator LONG. Let us just get that down in figures.

Mr. PEIREZ. There was practically $12,000 as the part of valves in, say $650,000 worth of cameras. They wanted 7½ percent of the $650,000 to supply the data on some $12,000 worth of valves.

Does that bring it down to the figures you are looking for?

Senator LONG. It is about $135, if I have calculated it correctly. Hycon wanted $135 royalty or commission on every camera sold, for doing the work on a $30 part which would not work, if I understand correctly?

Mr. PEIREZ. Not doing the work, supplying the information.

Senator LONG. Did they get it?

Mr. PEIREZ. Not from us.

Mr. GORDON. Why not?

Mr. PEIREZ. We simply felt, and I told their vice president and general manager that I felt, that this had been developed at Government expense, and that we would not pay it.

Mr. GORDON. If these items were really proprietary they could sue you—well, they could sue the Government.

Mr. PEIREZ. No. I imagine they could sue us, but we are prepared to defend it.

Mr. GORDON. I think under such conditions the Government stands between you and the plaintiff.

Mr. PEIREZ. I do not know, but we have not been sued to date; that is all I can tell you.

Mr. GORDON. Supposing you had paid them the 7½ percent royalty. Wouldn't you be at a cost disadvantage right from the very beginning if you were competing with Hycon?

Mr. PEIREZ. Absolutely; that is obvious.

But, as I say, we disregarded it, and did not think we were going to pay it, and felt strongly enough about it so that we did not intend to pay it, and we were prepared to defend the lawsuit.

Mr. GORDON. Hycon has taken no legal steps?

Mr. PEIREZ. Well, as of yesterday, none.

Mr. GORDON. Let us now come to your experience with the KS–36 camera. Was this a research and development or a supply contract?

Mr. PEIREZ. For Viewlex it was supply, with minor development. The R. & D. on this had already been done. This is the one that I was talking about earlier, where one-third of the cost of the camera—is about $3,300, $3,400—one-third of the cost of it is for a set of lenses.

When we started to estimate this, we ran into what I told you the situation was on lenses.

We then, knowing a little bit about lenses, decided if we were really stuck we would make them ourselves. We discussed with Professor Motz, who heads up one of the departments at Columbia, the question of a different type lens submitted than in our bid, and so we were prepared to make our own lenses if we were awarded the contract and could not resolve the problem any other way.

Then we tried to get the lenses from Kodak, Bausch and Lomb, rather than make them ourselves, because no matter how good the man is, and I think Professor Motz is excellent, you still have got to get the know-how under your belt, and that costs a lot of money.

But the prices we were quoted were so high that we were about ready to make them ourselves, when Wollensak apparently reached an agreement with Kodak on some kind of license fee, and quoted us a price reasonable enough so that we bought these lenses from Wollensak.

However, they were made, at least one of the three lenses was made, under a license arrangement with Kodak and, as I said before, this was one of the lenses developed specifically for the Government.

Mr. GORDON. You said on page 5 of your statement that tools to make lenses were available.

Mr. PEIREZ. I have not been able to locate the correspondence on it. I will within the next 2 weeks.

But Kodak did say the tools were available for these lenses; that it would be necessary for us—this is to the best of my recollection—to obtain approval from the Government for the use of these tools since they were Government-owned and Government-paid for.

We knew that this would be easy to obtain. But the approximate prices quoted for the lenses were so far out of line, they were too high, there was no sense in processing this any further.

Mr. GORDON. What was the price and what conditions did they propose for the use of these Government-owned tools? These are Government-owned tools, are they not?

Mr. PEIREZ. What was the condition of the tools?

Mr. GORDON. What conditions did they require to use the tools and also what price did they want for the use of the tools?

Mr. PEIREZ. I think, and I would not like to be held to it, it was $1,800 per set of lenses for the camera.

We wound up getting them for about $1,035 from Wollensak, which included the license fee, incidentally.

Mr. GORDON. If these are Government tools, will the Government ultimately get paid for the use of these tools by you? You said you used the tools.

Mr. PEIREZ. We did not use these tools.

Mr. GORDON. You did not use them?

Mr. PEIREZ. They are in Kodak's possession.

Mr. GORDON. I see. They were Government-owned; is that correct?

Mr. PEIREZ. That is right.

Mr. GORDON. Why were you unable to secure the use of these tools?

Mr. PEIREZ. The tools, as such, are of no value to us. The tools in Kodak's possession, with Kodak making the lenses for us, and discounting the fact that the tools were already paid for, and the development was already paid for, should come up with a price that would be certainly in the range that Wollensak came up with.

Senator LONG. Let me see if I can get that straight. How much would it have cost you to get the lens you were trying to acquire from the Kodak Co.?

Mr. PEIREZ. About $1,800.

Senator LONG. About $1,800.

Now, you were later successful in obtaining this from Wollensak for how much?

Mr. PEIREZ. About $1,035, a little bit over $1,000.

Senator LONG. So there is a difference there of almost $800, an extra $800, above the $1,000 cost.

Were you bidding for this to construct this camera at a certain price?

Mr. PEIREZ. Oh, yes.

Senator LONG. And as far as you are concerned, you simply could not deliver the camera to the Government within your bid price unless you could get that lens at a reasonable price because that was about one-third the cost of it then; is that correct?

Mr. PEIREZ. Yes, except I should explain this so you will understand it. Before you submit a bid you should have an idea of your prices, and we did.

Senator LONG. Yes.

Mr. PEIREZ. And we had prices ranging from as little as $800 to, as I said, initially, the $1,800 of Kodak's.

We thought that that was completely unreasonable, Kodak's price, and we then consulted, as I say, with Professor Motz about a design on a lens, and we arrived at the conclusion that if necessary, we would make those lenses for someone between $1,100 and $1,200 a set.

Now, when we were able to get them from Wollensak, as a matter of fact, if we had to we would pay $1,200, $1,300, or even $1,400 because we had estimated $1,200 in the bid rather than start making lenses and paying the terrific cost of learning how, because these are rather complicated lenses.

Does that help you see the point?

Senator LONG. Yes. But the problem though is that the technical information which the Government paid for was difficult to get; is that correct?

Mr. PEIREZ. I would say it was impossible to get.

Senator LONG. How about the tools? Would the tools have been easy to get? They were in Kodak's possession, but owned by the Government, if I understand it.

From your point of view as a small businessman, would those tools have been easy to get, in your opinion, or difficult?

Mr. PEIREZ. We have gone through that before. We do not even try to get tools when they are somewhere else, even if we think the tools that we have gotten, are Government-owned. They are of as much value to anybody else. We would never have attempted to get them.

Senator LONG. Your problem was that if you had got them you probably would not know how to use them, to start with?

Mr. PEIREZ. That is right.

Mr. GORDON. Have you been able to manufacture the cameras yet?

Mr. PEIREZ. Oh, yes; we have delivered them. We are just about at the tail end. We were a little behind initially, but we are ahead. It was a tight schedule.

Mr. GORDON. I would like to come to the KA–30 camera that you mentioned. Was the KA–30 camera system developed under a Government R. & D. contract?

Mr. PEIREZ. Everything I have said about the numbers 20 or 36 is applicable to the 30. It is a systems camera.

Mr. GORDON. What company developed it?

Mr. PEIREZ. Chicago Aerial Industries.

Mr. GORDON. Has the data, the technical knowledge, been available to you so you could bid on it?

Mr. PEIREZ. It is not available to us. It is not available to anyone. They have been delivered in limited quantities.

We heard that there were five of the cameras in Pennsylvania under test, and we sent our man down there, but he was told that he could not see it.

We had heard that Monmouth had one. We went down there, and Monmouth said they had three, they were service-testing them, but were not available for any other purpose.

We know they are out in the various areas where they are being tested, I think Yuma, and Huachuca, Fort Huachuca.

We are told there are no drawings, no information, nor anything else available. Grumman called us and said that they understood we had a camera that might work with the Mohawk, which is part of the system, and all we did was phone Dayton and ask if it was all right to show it. That was the 36.

We did. Grumman was thinking of using it. I understand that Grumman was told to use the Number 30. Grumman got three of them. We wanted to see it, and Grumman was told that this was not to be shown to anyone.

Now, this camera we know has been in development and has been delivered in limited quantities for approximately 4 years, if not more. Recently, we made no attempt to get in on it, but we know there was a sole-source order placed for this camera.

We know of two or three people who called us and asked if we had any information on it. They wanted to bid on it, but we had no information available and told them so.

Senator LONG. Doesn't it stand to reason that the Government would get a better deal, would get those commodities cheaper, if they would let people who are able to build them see what they are and see the technical information and bid on them?

Mr. PEIREZ. Well, certainly it does; yes.

Senator LONG. It stands to reason that if just one or two people are going to make an offer to you that you are not going to get nearly the favorable price that you would get if you let several folks bid on it. That is an obvious way of doing business, is it not?

Mr. PEIREZ. That is so; and when we sent two men out to Fort Huachuca after we made initial deliveries of the cameras, we wanted to know what was happening, and we also wanted to keep in touch with it because we know there are more procurements coming up for this and other type cameras. Some of the prices that we were quoted for spare-parts costs were just unbelievable. We just do not believe it.

We think the people out at Fort Huachuca are wrong. They cannot be paying $35 for a lock on a camera, which is worth about $1.20, but this is what they told us.

Senator LONG. They are paying how much?

Mr. PEIREZ. They were shy on some cam locks on the camera. Those that they had for Hycon, we both used the same lock, and one of the two men we sent out phoned in and said, "Send us a couple by air; they are short a few. They claim they have to pay $35 apiece for these."

I do not believe it, frankly. I think there is an error. However, the danger——

Senator LONG. Maybe someone just misplaced a decimal point; maybe they are not paying a hundred percent too much.

Mr. PEIREZ. I do not think it is as low as $3.50 either, because I know what happens to spare parts when there is only one source for them, but I do not think it was $35.

Senator LONG. That is the information that came to you?

Mr. PEIREZ. That is right.

Mr. GORDON. Isn't this data Government property?

Mr. PEIREZ. Yes. In the case of Hycon and in the case of Chicago, I know it is, but the answer is that it is not yet available.

Mr. GORDON. Isn't there a provision in Defense Department contracts that all data be delivered up to the Government as quickly as possible?

Mr. PEIREZ. I do not know what is in their contracts. I can only tell you what is in ours. I would assume they are all more or less alike. Generally, drawings and the information are delivered at the end of the contract, and I must confess that the tendency to hold it up is rather strong from a businessman's viewpoint. It is a strong feeling to hold it up, because this keeps you in the position where no one knows what is going into the unit.

So if these contracts keep stretching out and there are modifications and changes—and we have had them—we can hold these drawings up for the life of that contract, and the succeeding contracts.

Mr. GORDON. Delaying tactics, then, are possible; is that correct?

Mr. PEIREZ. I think they are rather common.

Mr. ANSBERRY. Mr. Peiriz, on these contracts which you have had for the KA–20 and the KS–36 cameras, have your prices been lower than the previous prices paid by the Government?

M. PEIREZ. I do not know what the previous prices were. I must assume they were lower or we would not get a contract. I do know they were lower on each contract or we would not have gotten that particular contract, because these are bid prices.

Senator LONG. Let me get this straight, I think you have made yourself clear, but I just want to be positive it is clear in the record.

Under these contracts for research and development, because of modifications in the contract and the various things involved, if I understand you correctly, it is possible for the contractor to withhold information until the end of the contract and, as a practical matter, thereby to deny his competitors any practical right or opportunity to bid on the producing of the product?

Mr. PEIREZ. I would say that is so.

However, I do not think you ought to use our experience as a standard because we do very little R. & D. dollar-wise.

Senator LONG. Yes.

Mr. PEREZ. I would say maybe in the past 5 years we have done $2 million of R. & D.

Senator LONG. Well, you described one situation. Here is a camera on which you would like to bid. It is your impression the Government is paying an exorbitant price for the camera. You are not even able to see the camera or bid on it, if I understand correctly what you told me.

Mr. PEIREZ. That is correct.

Senator LONG. If you are successful on bidding on it, the technical know-how on that camera will probably not be made available to you when you go to produce it?

Mr. PEIREZ. Well, that is exactly what has happened.

Senator LONG. Your guess is if it happened to you, the chances are it is happening to others?

Mr. PEIREZ. I would say it has. I know of some instances where it has with others.

Mr. GORDON. I would like to go now from the specific to some more general questions.

Would you say that the present policies or practices have hampered your business and put you at a competitive disadvantage?

Mr. PEIREZ. Well, certainly, we could not bid on several items for some 3 or 4 years, and cameras were items which were actually in the field and under use or in any event under test service conditions, so that as limited as you want to call this production, and let us even assume it was limited to nearly 10 units, in my opinion, it would be time, it is high time, that one of those 10 be made available so that you can get competitive bidding, rather than be in the position that when you are ready for another X units, in the case of the 355 units, and then subsequently 400 more, and I understand now another 460, you only have one source, and you have paid for that development over 4 years.

Mr. GORDON. You say that at no time did you claim proprietary rights. Why not?

Mr. PEIREZ. We felt we got paid for it.

Mr. GORDON. You got paid for it.

Do you think that a policy whereby the Government takes title to a development that it pays for and puts it into the public domain so everyone could use it would aid or hurt your company?

In other words, would the fact that it is open to everyone discourage you from using it? Or we can ask the question a third way: Do you need a monopoly position as an inducement to invest in the production of a particular item?

Mr. PEIREZ. No. We would like to have it. But I do not think that anyone really relies on the patent, as such.

What they rely on is the know-how and the start that they get on the rest of the industry, and once they have got the start they maintain the lead by continually improving or getting other items out.

I do not think the patent, as such—of course, there are exceptions to it—but the patent in itself has ever made any one industry.

Mr. ANSBERRY. Mr. Peirez, is there any reason why drawings and data should not be furnished at the beginning of one of these contracts at the time you go into production? Wouldn't it be a simple matter

to duplicate the drawings and furnish them to the Government at that time?

Mr. PEIREZ. Yes, you can, but I do not think you have got enough warehousing space for the drawings you have got piled up. It is quite a problem with the Government agencies.

But there may be another way to do it. Since at least all the contracts I know of, and I do not know of any that are written without requirements for drawing and data, and so forth, since the costs of that are already in there, if you were to say and make part of any contract a requirement that such information be furnished on request and, in fairness to the contractor's convenience, to be limited to maybe 5 times that you can request it, maybe 10 times, I am convinced that that would not raise your price any, particularly if it was clear that the information furnished at any one stage or any one time at any one period was the best information the contractor had available, and without any recourse to the contractor; and you would not have to load your warehouses with drawings or anything else.

When you are in a stage of development and it is 1 year or 2 years or 6 years old, and you people think it is time for competitive bidding or that you want to get more than just one source in on it, and you think you have got a competitor with some know-how—obviously not all the know-how that the one outfit that has been working on it all along would have—and you were then in a position to call for that information, get it, and lay it out on the table so that two or three or four competitors could come in and look at it, you would get a much more intelligent bid, and you would keep—and I mean us and any other contractor—on his toes. He knows then that someone else is looking at it with a half-intelligent eye anyway.

Mr. GORDON. Yes.

Mr. ANSBERRY. This rather simple change in contract then would obviate this problem you have been encountering over all these years?

Mr. PEIREZ. I do not think there is any simple cure, but it certainly would add considerably to your competitive situation. You would create one.

You would also open the door, I think, to small businesses or small groups of small business people who, combined together, could tackle one item that they cannot, that no one individual can, because your systems program is—without a question in our minds, and of all the small business people we know—the death knell for small business.

As a matter of fact, we have definitely planned to get out of Government work for this reason. There is no longer any such thing as a camera, and I think it is the last to fall. It is a complete system, and it is becoming, either the airframe or the airplane maker or the missile maker who becomes the manager for the entire unit, and then goes out and hires a number of subcontractors and, fortunately, or unfortunately, we have reached the stage where we definitely decided, oh, I would say, 15 years ago we would not do any more subcontracting work, and since we can afford to take that position, we are going to.

I know we would rather go to work than work on subcontract. We just do not like it.

Senator LONG. What do you dislike about working on subcontract?

Mr. PEIREZ. Well, we do not like the ups and downs; we do not like the fact that we do not know when or why a change is being made.

Senator LONG. Would you give me some idea of what you mean by that?

Mr. PEIREZ. Well, I will be specific in these units.

There is talk that the 20 camera is going to become part of a system. We are happy to take the 20 as a complete camera. The 20 is bought from us or anyone else as a camera. The electronics are bought from an electronics firm and the platform or vehicle and, incidentally, all of this is based on carrying just this camera which, in effect, is the fire control or the firepower, takes the picture rather than lets loose the warhead.

Under the systems program we will have no freedom to decide how or when the camera should be made; we will be responsible to one company who, if in their wisdom they feel that the camera should be made of such type and style and size because the platform or the electronics or some other section of it requires these changes. From an overall basis they may probably be right, and it is easier for them to say, "We don't care how you get it done, but you make this camera to conform to what we think it ought to do," we just do not want to go along with that idea.

Mr. GORDON. As a subcontractor do you get to retain patent rights to any inventions made under a subcontract?

Mr. PEIREZ. We were subcontractors at one time or rather, let us say we were contractors on a contract basis, we would take items. We retained the right to use it ourselves.

As a matter of fact, I think in 1938 we worked with Canada Dry, and I forgot, we were permitted to use the idea that we developed, and they paid for all the time and, I think, they were very liberal in that. We were permitted to use it on anything else we were working on, but nothing in competition with Canada Dry.

Senator LONG. In view of the experience you have had in patent policy and in dealing with Defense, what would your recommendations be? Would you have a suggestion to make as to how you think the patents resulting from an R. & D. contract ought to be handled?

Mr. PEIREZ. I think—I do not know, I may be the wrong man to ask this of, Senator, because I do not think the patents in and of themselves are the prime factor.

I think it is the size and control on an overall basis that makes it impossible to compete.

I think that you can see that you are rapidly getting to a point where you are limited to two or three companies practically in the case of—well, take the missile program or rather that section of it that comes under combat surveillance, which is the Signal Corps.

You are limited to two or three companies. Republic went into it not long ago, and Rheem, and I think you have got another one in it. I think you have two companies or three, at most, and the general size and structure is such that I do not think the patents enter into the picture at all.

I do not see how anybody but two or three can compete and I think that this weapons system program is going to bring this to a point where there is no question that there will be just two or three left in any one field.

Senator LONG. Do you have any suggestions as to how the Government policy might be modified so that more businesses could compete in research and development as well as production contracts?

Mr. PEIREZ. I think, sir, that if it were necessary for any contractor to disclose, not necessarily disclose the patents, as such, but to disclose that in his bid, were so many patents, that he was or was not charging for these patents, that thereafter, after the award, that anything that developed would be disclosed to the Government, that if it was a normal development and covered by the cost of the contract it belonged to the Government; that if it were something that was developed during the life of the contract, but by some other division or department or some other area of that company, and on their own funds, and this can happen, of course, and does, that some equitable compensation were given to them since this is being used in the existing contract, that thereafter these items, as I said before, were available when the Government called for it for competitive purposes, and that the rights to use all items for which the Government has paid were given to the Government, and only for Government use, and that all commercial rights were completely preserved that, I think, would make considerable progress.

So that I will be a little clearer on it, if patents are in existence today prior to an award, you are told that these patents will or will not be used. If they are being used you are told how much you are being charged for them; that any thing being developed during that contract is either paid for by the contract or that you are charged for it if it is not being paid for by the contract.

Thereafter you have the right to use this for Government use only, and in no event turn it over for commercial use. I think that is more than adequate protection, and I do not think you will be paying for it time and again.

Senator LONG. Thank you very much, Mr. Peirez.

Mr. PEIREZ. Thank you.

(The prepared statement of Mr. Peirez follows.)

PREPARED STATEMENT OF LOUIS PEIREZ, PRESIDENT, VIEWLEX, INC., LONG ISLAND CITY, N.Y.

We are submitting a statement in accordance with requests, i.e., your November 19 letter and telephone conversation with your Mr. Ben Gordon on November 17.

We agree with your statement "* * * that the liberality of some Federal agencies in granting patent rights to the large firms working under Government research contracts automatically and unnecessarily rewards the giants of American industry at the expense of their smaller competitors." As a matter of fact, it is our opinion that the situation is much worse and that the selection of several large companies as suppliers of complete systems will result in a very limited number of "giants" controlling materials required for defense.

It appears to us that the will of Congress is actually reflected by those that administer the various agencies. It is our firm opinion that what Congress and the administration wants accomplished is accomplished. It is our opinion that to date the administration has favored big business, mergers, control by a few and, in general, the "trickle down" idea. Bill S. 500 seems to continue this type of practice.

We have had several specific situations wherein technical knowledge was represented to us as being of a proprietary nature despite our contention that this technical knowledge was a direct result of Government-financed contracts. For example, Hycon Manufacturing Co. had and still has a number of contracts with the Government for the design, development, and production of the KA–20 camera. A considerable amount of Government funds was spent with Hycon

before the first camera became available. It is our considered opinion that this aerial camera was developed under Government-financed contracts and would not have been produced for or by private industry.

For several years we knew of the requirements by the Government for the KA–20 camera and associated equipment. We made various attempts to obtain technical knowledge of the KA–20 camera so that we could bid on a competitive basis. Drawings were not available. Models were not available. Information was not available. Offers to visit any location where a KA–20 camera could be inspected were of no avail.

There were no security problems. We are convinced that each Government employee involved made a conscientious effort to make the information available so that competitive bidding could be accomplished. As a matter of fact, expressions of opinions by various Government personnel indicated that requirements had to be "sole sourced" because of nonavailability of information for competitive bidding.

In view of the fact that every Government contract requires complete detailed information, i.e., drawings, literature, technical data, manuscripts, spare-parts provisioning, it seems most peculiar that no technical information could be made available after several years of development, after delivery of a number of prototypes, production samples and, in some instances, production quantities.

Our persistence in following this matter finally resulted in creating a competitive situation for a quantity of 355 KA–20 cameras on a negotiated basis. Finally we obtained contract No. DA–36–039–SC–66495, dated June 30, 1958, for 355 KA–20 cameras. We did obtain a GFP model for guidance purposes from the Government. We were unable to obtain any drawings for quite some time thereafter.

Shortly after receipt of a contract for the KA–20 cameras we made every effort to obtain complete technical data from the Government. This was simply unobtaintable because Hycon had not supplied such data which should be and probably is required under their various contracts with the Government. It appears that Hycon took the position that certain items in the cameras were proprietary and that Hycon would furnish neither drawings nor technical information. We know that various Government personnel, both civilian and military, made serious efforts to induce Hycon to supply the information. We know that the various Government personnel expressed their surprise to Hycon, the opinions that such information was paid for by the Government in the contract, etc. Apparently Government personnel were unable to obtain the necessary information.

Thereafter we contacted Hycon and were unable to obtain any satisfactory arrangement to use the technical knowledge already established by Hycon at what we consider Government costs. We made this position clear to Hycon officials. The best that we could get was a statement to the effect that Hycon would release information only upon an agreement wherein we would pay 7½ percent royalty on the total dollar value of the contract.

It should be noted that Hycon was fully aware of the fact that all we were interested in was the valve which is a component of the camera and represents approximately $30 of a total cost of $1,800 per camera. It should also be noted that the valve was not satisfactory insofar as the Government was concerned and that part of the requirements of the contract placed with us was that the problems encountered in the value to date be remedied. Hycon was aware of this. Hycon was aware of the value of the valve, the failure of the valve to meet contract specifications, the cost of the camera, the position of the Government. Despite this, Hycon insisted upon 7½ percent royalty on the total dollar value of the contract.

Hycon Manufacturing, its affiliates or subsidiaries, appear to be "war babies." It appears that they started in business in 1946 as a result of the defense requirements. It appears that their entire business is based on military requirements. From the statistical information available to us it appears that all of their operations, V-loans, tax benefits, etc., are a direct result of defense requirements. There seems to be little room to accept any proprietary claims or interests that could have been financed by private capital in the case of Hycon. We have several suggestions that could very easily eliminate such situations from occurring again in the future.

Another specific example of the control of proprietary interests is that of lenses used in aerial cameras. We were awarded contracts Nos. AF–33–600–35785 and AF–33–600–38018 totaling 492 KS–36 cameras at an approximate price of $3,300 each. Each camera was required to be supplied with three lenses, i.e.,

one 6-inch, 12-inch, and 24-inch lens. The approximate value of the three lenses was $1,100 each unit, one-third the total dollar value of the contracts.

Immediately after obtaining the first contract we began to look into the problem of lenses. We were aware of the fact that the Government had spent considerable amounts of money with Eastman Kodak and other lens makers in developing aerial-camera lenses and for the purpose of being in a position to have lens sources available whenever needed. After many telephone calls and visits with various personnel in Washington, Fort Monmouth, and Dayton we were able to locate some of the information but not technical details.

Eastman Kodak and Bausch & Lomb were extremely careful in their approach, indicated that certain information was available, that such information had been supplied to the Government, that certain Government-owned tools were available, but would not supply technical details, drawings, etc.

We worked with several smaller optical companies capable of producing lenses. We finally were able to place an order for our lens requirements at what we considered a reasonable price with Wollensak Optical Co. in Rochester. We understand that it was necessary for Wollensak to arrange to pay a license fee to Eastman Kodak in order to manufacture some of our lenses. It is our recollection that Eastman Kodak indicated by letter to us that tools made under Government-financed contracts were available, that lenses could be made by Eastman Kodak with permission of the Government to use such tools, etc., but the conditions and prices made this completely impractical.

Since we have been unable to collect all of the information concerning lenses for the KS–36 camera within the alloted time, we feel it advisable not to go into further detail until we can get more specific information. We hope to have this available for you in the near future.

We readily agree that in the case of Eastman Kodak and Bausch & Lomb there is some justification for the "zealous guarding" of "trade secrets" and insisting on proprietary rights. Certainly there is no question that both companies carry on independent research and development paid for by company funds. The ability to draw a clear line of demarcation as to which is and which is not Government financed can become complicated but is readily solvable in our opinion.

Another instance of control by proprietary interests is that of the KA–30 camera system. This has been in development for approximately 4 years. Drawings are not available. Models are not available. Neither specifications nor even meager details are available. Deliveries have been made, some Government agencies have units for service tests, but every effort to obtain information meets with complete failure.

Rumors regarding the KA–30 system and the handling of the entire matter so that only one contractor, i.e., Chicago Aerial Industries, remains the sole source on a noncompetitive basis have been rife. In view of the fact that the entire camera and system was developed under Government contracts and funds it seems odd that the technical knowledge, drawings, and other information which makes possible competitive bidding has not yet been accomplished. It is peculiar that the specific instances quoted herein all emanate from the same Agency, i.e., Combat Surveillance Division, but this is probably coincidental.

Mr. J. E. Welch, Deputy General Council of the U.S. Government Accounting Office, delivered the views of the GAO on subcontractor's problems under the "Weapon System Concept and Related Purchasing Policies and Procedures" on October 8th, 1959, at Monterey, Calif., in his talk Mr. Welch said, "To further develop the point on the effect of weapons-system concept on the competitive structure of our defense industry, it is necessary to examine the question of proprietary rights and how this problem could adversely affect the Defense Department's control over technical characteristics and quality of defense procurement. Under more conventional methods of procurement, i.e., where the military department retains primary responsibility over design and development of a weapon or a weapons system, the Department contracts directly for major subassemblies, systems, and subsystems with the result that a large number of suppliers participate in the development of a particular weapons system. Thus, many firms are given an opportunity to do research work and expand their capabilities in both military and commercial production. Broad participation increases the likelihood of more rapid advancement in the state of the art. These firms generally have no hesitancy to disclose to the military department their designs, drawings, manufacturing processes and other technical information relating to the item being produced or developed. They know that new

scientific discoveries and techniques developed through the use of Government funds are generally made available for the use of American industry and that the Department of Defense will or should take reasonable precautions to respect their proprietary rights on any manufacturing processes or patents developed for application in their manufacture of commercial goods.

While the protection of proprietary rights has created some problems in the past, a procurement concept which tends to shift the administrative responsibility for design and development of large complex systems from the military to a few prime contractors may now present an entirely different situation. Can the system prime contractor be relied on to protect the proprietary rights of his subcontractor? Will the system prime contractor expand or constrict the distribution of research and development funds?

The practice of pirating or proselyting technical skills and knowledge has always been a possible evil in competitive indutry. There is serious question as to whether or not tendencies to monopolize advanced skills and manufacturing processes through the proselyting of subcontractor technical information and knowhow might tend to discourage subcontractors from participation in the defense effort and thus the base for technical advancement would be narrowed. Can the military departments afford to abdicate their responsibilities in this area? Reluctance on the part of subcontractors to disclose technical information, cost and pricing information, and other proprietary information could lead to inferior products at exorbitant prices and a gradual deterioration in the competitive structure.

The second question concerning the distribution of research and development funds is, of course, closely related to the first question of protection of proprietary rights of subcontractors. It is a problem involving competition. A company that develops a device under a Government contract may retain commercial patent rights although yielding to the Government a royalty-free license to have the item manufactured for military use. The company may have to spend additional sums of money to adopt or develop a military item for commercial use, yet a Government research and development contract often enables it to investigate fields that would be too expensive for them to explore with their own resources. Can system prime contractors be expected to show impartiality in the selection of subcontractors to engage in research in competitive fields? The channeling of all this patent potential to a few major system prime contractors could lead to monopolistic trends. It would appear that if the military departments are to let their inhouse capabilities lag to the point of letting major prime contractors dominate the field of design research and development of advanced and complex systems the U.S. Government would be contributing to these trends rather than striving to prevent them. While a few of the large companies may possess extremely high capabilities for advancement in scientific endeavors, it is doubtful that the effort of the same few companies would be as effective as the combined efforts of a much larger segment of industry achieved through employment of the forces of full, free, and open competition."

We have purposely quoted Mr. Welch directly to avoid any question of taking statements out of context. We urge that you consider carefully the additional avenues you are opening to abuses by contractors for the many reasons indicated by us previously.

Hearsay or rumors are dangerous and we prefer not to quote such items. However, complete records and documentation is readily available to you. We feel that you would be well rewarded if you were to take one situation and look into it from its inception. Interoffice memorandums, notes, differences of opinions and methods of procurement on the KA–20 camera should be most interesting to you. For example, you will find that despite the efforts of many Government civilian employees to place contracts for the KA–20 on a competitive-bidding basis, awards were made continuously on a sole-source basis to Hycon until the first award was made to us on a negotiated basis. Your study of this case will further indicate that on a subsequent award made to Chicago Aerial Industries, again on a negotiated basis, the necessary technical information was not yet available to the Government insofar as Hycon was concerned. You will find, however, that we, Viewlex, had supplied complete drawings including the development of a new valve and other items. You will also find that we had more right to claim proprietary interests on the valve and several other items since we had taken the contract on a firm fixed-price basis. You will find that at no time did we claim proprietary rights.

You will also find that we suggested an IFB type of bid and that we formally protested continued negotiated type of awards. You will find that there was a

considerable difference of opinion as to how these cameras should be procured between various Government agencies and that one or more agencies insisted on IFB competitive bidding but was overridden and that authorization to procure first on sole source and finally on negotiated bids was issued.

The inherent dangers in the present weapon system procurement program are apparently minimized and appear to be completely ignored. Mr. Welch has clearly stated some of the dangers that exist in this program. There can be no question that under the weapon system procurement program almost all developments wil be controlled by the few "giant" industries. There will be no way for the Government to determine which items were developed by the various independent subcontractors. As a matter of fact, there is serious doubt as to whether there will be any part under this program for independent subcontractors and even more so in the case of small business.

Under present Government procurement methods drawings are required. However, drawings are generally furnished only after completion of the contract. The purpose of this is to assure the Government of obtaining the very latest drawings complete with revisions, changes, etc. This may be excellent in theory but works to the extreme disadvantage of the Government. When the interest, and in some cases the avarice, of the individual contractor is taken into consideration, drawings are furnished at the latest possible date so that information will be kept from the Government and the public for as long a time as is possible.

To summarize, there are several methods of protecting the Government. The "shotgun" or "cure all" method of simply declaring by congressional act, Executive order, or by any other legal means that there will be no consideration given to prorietary rights is undemocratic and unnecessary. The simple and proper method is to ask for a clearcut statement from every contractor prior to award as to what proprietary rights exists and will be used in the completion of the award under consideration and what portion of the costs represents such proprietary rights. In addition, each contractor should be required to state that any item developed thereafter that has any proprietary rights will be disclosed to the Government immediately. Further that such proprietary items that were developed during the life of the contract were either developed as part of the contract and are absorbed in the charges under the contract or were developed independently of the contract and at company costs. Further that in the event the item is developed a company costs, the item is being supplied on either a no-cost basis or at some nominal sum. In addition, each contract should contain a clause stating that the Government has a right to all technical information and drawings at any time requested. In other words, such technical information and drawings must be furnished during any stage of the contract so that the Government will be in a position to supply such information to other contractors for competitive bidding purposes. In fairness to the contractor it should be stated that the information and drawings supplied are not guaranteed to be accurate and are without recourse to the contractor as to accuracy. A limit to the number of times such information can be requested by the Government would eliminate any questions as to costs. A limit to a nominal number of times (i.e., 5 or 10 times) during the life of the contract would not in any way increase the costs if made known at the time of bidding. Further it would eliminate the need for the Government of having voluminous correspondence and drawings on hand since it would be necessary to call for such information only as required.

Senator LONG. I believe we will have time to hear Mr. Harry Stern of Action Manufacturing Co.

I will ask you, Mr. Stern, to just proceed and read your statement.

STATEMENT OF HARRY STERN, PRESIDENT, ACTION MANUFACTURING CO., PHILADELPHIA, PA.

Mr. STERN. Thank you, Mr. Chairman.

Action Manufacturing Co. is a small business situated in the northeast section of Philadelphia and employing approximately 125 men and women. We are primarily engaged in producing electro-mechanical mechanisms and instruments and in the overhaul and repair of

aircraft instruments. Our business was established in 1946 and has been operating since this inception.

The president and writer of this statement, namely, Harry Stern, is a journeyman toolmaker and a graduate mechanical engineer.

The purpose of this report is to bring to the attention of the proper people the difficulties experienced by our company, as well as other small businesses, in competing with the original manufacturers of aircraft instruments for the overhaul and repair of these aircraft instruments. The major reasons for our inability to compete in the overhaul and repair of certain instruments is due to the difficulty or impossibility of obtaining replacement parts and/or test equipment to meet the required Government delivery dates. Failure to meet the Government delivery dates has been the basis for rejecting our proposals or proposals by manufacturers in the same situation as our company. As a result of the long delivery dates promised by the manufacturers of these instruments who are in the only position to supply these parts and test equipment and due to the claim of some of these manufacturers that they have proprietary rights, a situation exists which is untenable as far as we are concerned. This claim of proprietary rights either results in an outright rejection to sell replacement parts and/or test equipment or the delayed delivery seems purposely designed to cause rejection of our proposal by the Government who has previously established the required delivery dates.

We believe that the Government has financed the majority (if not all) research and development work on the aircraft instruments for which we are trying to receive contracts for the overhaul and repair and that the claim of proprietary rights are strictly in the hands of the Government. It is inconceivable that any company would or could undertake the expenditures of millions in the development of an aircraft instrument based on the hopes of ultimately selling it to the Government or private industry. We believe that all of this research and development would be contracted by the Government through prime or subcontracts and therefore all developments, designs, parts drawings, tooling, specifications, test designs and test equipment, all belong to the Government and, if not turned over to the Government completely, should be available upon Government request on the behalf of the Government or on the behalf of an aircraft instrument overhaul shop contracted to do the overhaul and repair for the Government.

A monopoly in this situation is a simple matter where the manufacturer of the original equipment controls both the parts manufacturing and the retention of the test equipment design because any aircraft instrument overhaul shop would have to go to these firms and these firms only to purchase all parts and test equipment. By giving the overhaul shop unrealistic deliveries (if any) and by establishing exorbitant prices for their test equipment, if they entertain any desire at all to sell this equipment, they automatically disqualify any overhaul shop other than their own due to the inability of their competitors to obtain parts or equipment on time to meet the required deliveries (see Kollsman Instrument Corp. letter dated August 18, 1959, and our letter to them dated July 13, 1959).

Senator LONG. I will have the reporter insert your exhibits at the end of your statement. (See exhibit II, beginning p. 47.)

Mr. STERN. Yes.

Senator LONG. Go right ahead, sir.

Mr. STERN. This maneuver by certain of the original equipment manufacturers does not permit any company to compete with them for the overhaul of aircraft instruments if they wish to exercise the advantage of their monopoly. For, by forcing the Government to disqualify all bidders, due to the inability of small business firms to obtain the necessary repair parts, components, or test equipment from the only and single source, they alone can receive the award. It is therefore obvious that either the original equipment manufacturer should (1) not overhaul instruments or (2) not manufacture parts or, (3) turn over the parts prints to the Government (which has normally been paid for by the Government) for reissuance to other manufacturers so that they can produce the parts and test equipment competitively.

The original instrument manufacturer should be forced to compete on both the furnishing of parts and test equipment in the overhaul phase, although it is the writer's belief that small business concerns can do a much more effective job in the overhaul and repair of aircraft instruments and other instruments from both the delivery and cost factors. Also it is my belief that the Government should receive all the data for which it has paid and the right to go back to the original manufacturer in order to obtain any and all information inadvertently left out of the technical order manuals giving details on the overhaul and repair of these instruments as part of the original package. This information should be made available to the competing instrument overhaul shops at no cost so that in preparing a bid the instrument overhaul shops can give firm and fair prices. Furthermore, parts prints should be made available at all times so that the original manufacturer is forced to compete with other parts sources. Test equipment design (and test equipment made by the manufacturer with Government funds) should be available at all times so that the Government can be assured a competitive price and a reasonable delivery. In other words, once the Government has procured the original overhaul instrument or instruments from the instrument manufacturer all "know-how," equipment, design, and subsequent changes and improvements should become the property of the Government and be made available to firms interested in the repair and overhaul of aircraft instruments, where it is in the interest of the Government to do so. The claim of proprietary rights by many manufacturers is not valid and if checked into carefully, regarding the means by which these so-called proprietary rights were developed, would reveal in many cases that this company does not have any proprietary rights and that all proprietary rights rest with the Government.

The claim of proprietary rights creates a monopoly, tends to eliminate all competition, and places the Government in a position to accept all terms and conditions established by the original instrument manufacturer. This contributes to higher costs, longer deliveries, and may jeopardize the security of our Nation. Furthermore, this monopoly created by a claim of proprietary rights forces the Government to go back to the original manufacturer who can name his own price, his own conditions, and his own delivery, if at all interested in doing so. It can force the Government to give them all its overhaul

and repair work at the price and conditions they name. But, effect on small business is absolutely devastating and in many cases catastrophic because there is no opportunity for the small business to compete with all the odds stacked against it.

Enclosed is attachment A, illustrating a typical claim of proprietary item which is in reply to our letter dated 13 July and marked attachment B. Attachment C is a typical answer to our request for quote on aircraft instrument parts from the original manufacturer.

Experience has shown that in many cases where Government assistance is solicitated by us we can obtain delivery within 10 days where original promises were made for delivery within 6 months. Attachment D is a statement submitted to small business with our certificate of competency form after having been rejected by the Air Force office for our inability to meet required delivery on the proposal and attachment E is a copy of a rejection given us by small business which was based on our inability to obtain parts and test equipment from General Electric Co. in sufficient time to meet the deliveries. Although we were the low bidder we were disqualified. Attachment F is a list of some firms who have cooperated with us in obtaining parts and test equipment.

Is it necessary to read the exhibits?

Senator LONG. I believe we will put those in the record at this point.

(Exhibits submitted by Mr. Harry Stern follow:)

EXHIBIT II

(Attachment A)

KOLLSMAN INSTRUMENT CORP.,
SUBSIDIARY OF STANDARD COIL PRODUCTS CO., INC.,
Elmhurst, N.Y., August 18, 1959.

Re your letter dated 7–13–59.

ACTION MANUFACTURING CO.,
Philadelphia, Pa.

(Attention of Mr. William D. Dugger, Instrument Supervisor)

GENTLEMEN: In reply to your referenced letter please be advised that we cannot supply you with the information you request, due to the fact that the items of test equipment in question, are proprietory to Kollsman.

Please be advised that each of the units utilize Kollsman synchros which are absolutely necessary for the operation of the equipment. The 120-day delivery date which was given to you for the test equipment is predicated on the lead time required for these synchros.

We have brought your problem to the attention of our repair department, and they have indicated that they would be receptive to repairing these items for you.

If you desire any further information concerning this matter, please do not hesitate to contact us. Repair information requests may be directed to the attention of Mr. J. V. Connelly.

Very truly yours,

KOLLSMAN INSTRUMENT CORP.,
W. ANDERSON,
Manager, Spares Support.

(Attachment B)

JULY 13, 1959.

Mr. W. ANDERSON,
Kollsman Instrument Corp.,
Elmhurst, N.Y.

DEAR MR. ANDERSON: We have a prime contract with the Air Force for the overhaul of aircraft instruments of your manufacture. This is an altitude synchrotel indicator, Kollsman Part No. A25561 04 001.

We have all of the test equipment required for the overhaul of this item except for the synchrotel null setting equipment, Kollsman Part No. 6721–0005. In a telephone conversation with your Mr. Al Belliveau, he indicated that the schematics or drawings sufficient for us to make a mockup of this test equipment was available and he would send this information to me. This is more than I had hoped for and I was looking for this information to arrive by mail.

Failing to receive these specs, I called Mr. Belliveau today to see if he had sent them. Mr. Belliveau said that this test equipment had become obsolete and that he had information on the newer piece of test equipment that he would send me after he cleared with his supervisor Mr. Tony Mule. Mr. Mule then spoke with me and said the information was not available because it is a proprietory item. This stops me; I cannot proceed with the overhaul until I have this information. We would buy the test equipment from Kollsman except the delivery date is 120 days. We would be delinquent on our delivery schedule to the Air Force. Also we only have a small quantity of instruments to do and I don't think this null setter has a general application for other instruments.

This test equipment is not obsolete for our use and I would sincerely appreciate any assistance you could give us in providing the information needed to adequately test this instrument. If there is an alternate piece of test equipment that could meet the same requirements perhaps you could offer some help in that way.

Very truly yours,

WILLIAM D. DUGGER,
Instrument Supervisor.

(Attachment C)

GENERAL ELECTRIC,
APPARATUS SALES DIVISION,
Philadelphia, Pa., April 3, 1958.

Your proposed order 8088, our file 320–3–7091

ACTION MANUFACTURING CO.,
Philadelphia, Pa.

(Attention of Mr. Lester R. Rubin, purchasing agent.)

GENTLEMEN: In response to subject request, we regret that we are unable to consider an order for aircraft instrument parts and must, therefore, offer no quotation.

Consistent with our policy on aircraft instruments, this would have to be our response to any other current or future inquiry for aircraft instrument parts.

On existing orders that you may have, we would suggest that you take action to secure the required parts through military channels since they would be readily available to them.

Very truly yours,

E. J. WOOD,
AVIATION & DEFENSE INDUSTRIES SALES,
By W. C. Rabe.

(Attachment D)

OCTOBER 7, 1959.

The following letter was submitted to the Small Business Administration, with a request for certificate of competency:

General Electric Co. was contacted by our facility in the presence of Government representatives from Middletown, and we were promised a delivery of approximately 6 months. This delivery, they assured us, would be the same for the Government, any competitors of ours, as well as for us; therefore, no better delivery can be obtained by any other facility. The Government has, however, offered us assistance in expediting delivery of these parts after receipt of this contract, consequently, an improved delivery may be gotten.

There is no doubt from the conversation with General Electric Co. that no other company could provide the Government with any better delivery than we can. The Government recognizes this problem and has therefore offered their cooperation in helping us with the acquisition of these parts after we receive the award of this contract.

(Attachment E)

SMALL BUSINESS ADMINISTRATION,
Philadelphia, Pa., October 14, 1959.

ACTION MANUFACTURING CO., INC.,
Philadelphia, Pa.,
(Attention of Mr. Harry Stern, president.)

GENTLEMEN: Reference is made to your application for a certificate of competency, COC–III–223, relating to the proposed procurement under RFP 36–600–60–5068, issued by the Middletown Air Material Area, Olmsted Air Force Base, Pa., for repair of Air Force instruments.

The Small Business Administration has given careful consideration to the application of your firm for a certificate of competency, and finds no sufficient reason for reversing the decision of the contracting office . Consequently, this Agency has declined to issue a certificate of competency in behalf of your firm.

We regret that conditions present do not justify issuance of a certificate of competency in this instance. I trust that your company will continue to avail itself of the many small business aids offered by this Agency, and hope that we may be of service to you in the future.

Sincerely yours,

L. M. BARCY,
Acting Regional Director.

(Attachment F)

ACTION MANUFACTURING CO.,
Philadelphia, Pa.

The following is a list of noncooperating firms:

Cadillac Gage Co., Detroit, Mich.
General Electric, Philadelphia, Pa.
Kollsman Instrument Co., Elmhurst, N.Y.
Moog Valve Co., Inc., East Aurora, N.Y.
G. M. Giannini & Co., Inc., Pasadena, Calif.
Avion Div., ACF, Paramus, N.J.
Airesearch Mfg. Co., Los Angeles, Calif.
Bendix Aviation Corp., Montrose Div., South Montrose, Pa.
Western Electric Co., New York, N.Y.

The following is a list of firms who have been cooperating in supplying parts, information, and test equipment:

Jack & Heintz	Sperry Gyroscope
U.S. Gage	Karnish
Fairchild Camera	Kearfott Co.
Minneapolis-Honeywell	Liquidometer Corp.
Harris Radiator, Div. General Motors	Surface Combustion Eng.
R. C. Allen	

Senator LONG. I want to ask you a question. Let me see if I understand this. Your business is engaged in overhauling and repairing instruments, if I understand you correctly?

Mr. STERN. We actually have three divisions. We build mechanisms like fire control instruments for tanks for the Government, like periscope mounts, superelevation transmitters, and other similar items.

We also make artillery fuses.

Senator LONG. What kind of fuses are those? Are they mechanical or electrical?

Mr. STERN. Mechanical fuses.

Senator LONG. What else do you do?

Mr. STERN. Of course, we have the overhaul instrument department, overhaul and repair.

Senator LONG. How many people do you have engaged in your instrument overhaul repair department?

Mr. STERN. Approximately 25.

Senator LONG. Twenty-five?

Mr. STERN. That is correct.

Senator LONG. When you have to repair an instrument, I take it, you bid on that work; do you?

Mr. STERN. Yes.

The normal procedure is the Government usually puts out a proposal to those who are qualified, and we are one of the qualified overhaul shops, and they make reference to certain technical orders and manuals which have been compiled primarily for the overhaul and tests of these aircraft instruments.

Based on what we read in the technical manual, we compute our price and we submit a bid on that basis.

However, we have learned that many of the instruments made by certain companies, make it a waste of time to try to bid because they will not cooperate. They are in the overhaul business themselves and therefore, since they control the part manufacture and the test equipment, we realize it is foolish. We waste a lot of time trying to compete with those companies which are indicated on the list shown as attachment F (see p. 49).

Senator LONG. It seems, if I might just read from one of your exhibits, that this was the case where you wanted to get some information about some equipment so you could overhaul it. The manufacturer of the equipment appears to have been the Kollsman Instrument Co. They say:

> In reply to your referenced letter, please be advised that we cannot supply you with the information you request, due to the fact that the items of test equipment in question, are proprietary to Kollsman.
>
> Please be advised that each of the units utilize Kollsman synchros which are absolutely necessary for the operation of the equipment. The 120-day delivery date which was given to you for the test equipment is predicated on the leadtime required for these synchros.
>
> We have brought your problem to the attention of our repair department, and they have indicated that they would be receptive to repairing these items for you.
>
> If you desire any further information concerning this matter, please do not hesitate to contact us. Repair information requests may be directed to the attention of Mr. J. V. Connelly." (See exhibit II, (A), p. 47.)

It states that copies were sent to Mr. J. V. Connelly.

What they are saying is, "Sorry, we can't provide you with the information to fulfill this contract. Now, if you want to talk to us we will be interested in taking your contract over."

Mr. STERN. That is correct. But actually there is a long story behind the whole thing.

I cannot say that this particular instrument, but I would venture to say, it is my belief, that Kollsman was paid for the development, research and development of this particular instrument, and that as part of the——

Senator LONG. What kind of an instrument is it?

Mr. STERN. It is an aircraft instrument which fits into the panel.

Senator LONG. Let me ask you, Do commercial planes use it as well as Government planes?

Mr. STERN. No. It takes many years before it sifts down to the standard where it is used by commercial planes. In other words, it is primarily made for Government usage.

Senator LONG. The probabilities are that all of this information was paid for by the Government in research contracts?

Mr. STERN. That is right; and the tech manuals, the manuals which are issued, with the instruments as a package are designed to help the men in the field, and help on overhaul shops, such as ours, to overhaul these instruments after so many hours of flying time.

Now, the Government accumulates these instruments, and puts out bids for their overhaul.

In the technical manuals which have been used with the instrument they are supposed to contain all the information necessary to overhaul these instruments.

However, reference is made in many cases, depending on the manufacturer, merely to a Kollsman, let us say, part number so and so, a piece of test equipment.

Now, this design which has been paid for, for this test equipment, and which is actually a part of the package for checking these aircraft instruments, should be available to the overhaul shops and, of course, to the Government which has paid for it, and should not merely be a number which is merely a reference number.

We are forced to go back to Kollsman to get the data and, of course, they claim—and in this particular case—that it is their design and their test equipment, and they have proprietary rights and, therefore, they do not have to release this information to us.

Yet you cannot possibly overhaul this aircraft instrument without that design or without that piece of test equipment. The Government has already paid for it and now the Government has to go back to Kollsman and give them the overhaul contract unless there is some other way of obtaining this information. Of course, normally the prices of the companies who originally manufactured the instruments run anywhere from twice to 10 times the price that it takes for a smaller shop to overhaul these instruments.

Senator LONG. Let us see if I have this straight. Here is a situation where the Government paid to develop an instrument, plus an instrument to test the instrument.

Mr. STERN. That is correct.

Senator LONG. The purpose of testing the instrument is to make the original instrument work, to overhaul it, repair it, and see if it is working right.

Mr. STERN. That is correct.

Senator LONG. But the Government has paid to develop both. The Government paid for all of this?

Mr. STERN. That is correct.

Senator LONG. If you, as a small businessman, want to compete with the fellow who developed this at Government expense, and make a better bid or a better offer to the Government, you are in the position that you cannot get control of either the information or the equipment——

Mr. STERN. Or the parts.

Senator LONG (continuing). Or the parts that the Government paid for, so that you could compete with these people?

Mr. STERN. That is right.

Senator LONG. The result is that you are left in the position where you are completely at the mercy, and the Government is also at the mercy——

Mr. STERN. The Government is at the mercy.

Senator LONG (continuing). Of the very people they have already paid for the technical information.

Mr. STERN. That is correct; and, firstline aircraft could be waiting on the ground for these instruments, and if a company, a large company, should decide they cannot give delivery for 6 months, and since they control the part, and since they control the test equipment, they can tell the Government, "You will have to wait 6 months for this," and we may have first-line fighter equipment waiting on the ground, waiting for these instruments.

It therefore jeopardizes our security because the cooperation by the various companies controls our own security.

Senator LONG. Let me see, where is this outfit, this Kollsman Instrument?

Mr. STERN. Kollsman is in New York.

Senator LONG. Where is that, New York?

Mr. STERN. In Elmhurst, N.Y.

Senator LONG. Well then, if you had some planes, let us say, out in Okinawa, and somebody wanted to do some repairing on them, he would have to wait until Kollsman would be ready to send him the parts?

Mr. STERN. That is right.

Senator LONG. Besides, he would have to comply with their terms and conditions?

Mr. STERN. That is right, unless, of course, the Government creates, that is, forces Kollsman to get out of the overhaul business, in which case they would merely sell the parts and test equipment.

There would not be that incentive to control the overhaul phase of the instrument, aircraft instrument, business.

Now the overhaul seems like an insignificant part, but it happens to be a very significant part of aircraft instruments because aircraft instruments are designed to operate for a certain period of time and then they require overhaul, and during the life of an aircraft instrument it may be overhauled 10 times, depending, of course, on the type of instrument, and the nature of the instrument, and the usage it has received.

So that this, what is considered to be an inconspicuous part of aircraft instruments, can turn out to be the most important part because you have aircraft waiting for these overhauled instruments, and we have had many examples where the Government has practically been sitting on our doorstep waiting for the instruments to be gotten out because there are first-line aircraft waiting in line to put them in the air.

Senator LONG. Would you just give me a good example or, perhaps even an extreme example of something that might have happened along that line that you know of?

Mr. STERN. Just a few months ago we were working on certain aircraft instruments, the need of which was so great, I do not think I should give too many details.

Senator LONG. Were there airplanes in the vicinity that needed the instruments?

Mr. STERN. Yes, that is correct.

Senator LONG. And they could not be taken off safely?

Mr. STERN. Because they did not have those instruments. There were none in supply, and they were dependent entirely on our overhaul to get them flying.

Senator LONG. The aircraft were located in the vicinity where your shop was?

Mr. STERN. No. I think it was somewhere in the airfields in Texas, in our own country.

Senator LONG. What was your problem? How long did it take you to get the job done?

Mr. STERN. We got the job done, but I merely want to point out what could exist. We were able to, of course, get these parts through certain cooperating companies, and we were able to meet the deliveries and get the aircraft off the ground.

But suppose a situation existed where the same overhaul was in the hands of a larger company which controlled every aspect of it and they did not want the contract, or said they were too busy, or had a different schedule. It would be difficult to get these companies to cooperate in the same way that we cooperate even though we do not have the control of the test equipment nor the parts.

Senator LONG. Did you meet your delivery date?

Mr. STERN. Oh, yes. We met our delivery date.

That is an example of where we met our delivery date, but, of course, we have instances here, and I have letters, primarily from General Electric and Kollsman where we know that since they are in the overhaul business, and since they control the sale of parts, and since they control the test equipment, we cannot get any cooperation from them.

The fact is I have in my exhibits one of the letters from small business in which we were turned down, although we were the low bidder on General Electric[3] instruments, where we could not purchase the parts, and they were—well, you can see the letter. I would like to read the letter or one of them.

Senator LONG. Which exhibit is that?

Mr. STERN. I believe that is attachment C (see p. 48). It says:

> In response to subject request, we regret that we are unable to consider an order for aircraft instrument parts and must, therefore, offer no quotation.
>
> Consistent with our policy on aircraft instruments, this will have to be our response to any other current or future inquiry for aircraft instrument parts.
>
> On existing orders that you may have, we would suggest that you take action to secure the required parts through military channels since they would be readily available to them.

Of course, this is not always true because in the preceding exhibit we had Government people on the phone with General Electric and they told the Government representatives, as well as us, that the Government would have to wait 6 months, like anybody else, or any of our competitors, for any of these parts.

Yet we have instances where we needed these parts, and the urgency for these instruments was very great, and we utilized the priority form through Wright Field and we obtained these parts in 10 days through Government pressure.

So, therefore, these parts were available. But the 6 months delivery causes us——

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[3] See statement by General Electric, Appendix X, p. 435.

Senator LONG. In other words, the parts are available within 10 days if they want to deliver them. But if they do not want to deliver, the parts are not available for 6 months?

Mr. STERN. I am sure every part is available unless the time is 6 months—not everything will take 6 months and, of course, realizing that our bid is contingent upon meeting the required Government dates, required delivery dates and our delivery dates might, say, start in 90 days. By telling us delivery of 180 days is the best delivery they can give us, we automatically are disqualified because we cannot meet the required dates by the Government.

Senator LONG. I am looking at attachment C here (see p. 48) which is the letter signed by Mr. W. C. Rabe. I think that is the letter from which you quoted, is it not?

Mr. STERN. Yes, sir.

Senator LONG. What were you trying to do there? Repair some instruments again?

Mr. STERN. That is correct. We needed some parts and they refused to sell us parts.

Senator LONG. As far as they were concerned, when they sent you this letter that meant you could not bid against them, did it not?

Mr. STERN. In other words, they wanted to discourage us from bidding against them on any type aircraft instruments.

Senator LONG. Well, was it not a case where it was impossible for you to bid against them unless you were in position to manufacture these same parts?

Mr. STERN. In some cases the Government gives us certain parts which are available, but we do not find out until after we take the instrument apart that there are other parts than those which the Government has furnished that are not available from the Government.

So, consequently, we go to General Electric and we say that we need these parts, and we need replacements, and their answer is, "We are sorry. We will not sell you parts. We are not interested in selling you parts."

If they did not have this overhaul phase, if they were forced to go out of the instrument overhaul business, then they would be very happy to sell us parts because they make their profit in parts.

But they would like to retain their profit on the original instrument, retain their profit on the part, retain their profit on the overhaul, retain their profit on the test equipment, and not allow any competition in their field.

So you can see that something has to give. They should be forced to give up the manufacture of parts so that other people can supply the parts, or they must give up the overhaul, over which they have such a complete monopoly that it is impossible for any company to compete with them.

Senator LONG. In other words, your position is that it could not be any worse than it is so far as the small businessman is concerned, so far as the uses made of the know-how resulting from research. Your feeling, as I understand it, is that they should not be permitted to be in the parts business, the overhaul business, and the equipment business if the effect is to give them a monopoly all the way through.

Mr. STERN. Yes, and the Government has paid for all this; that is what I am getting at. The Government is forced to pay higher prices through one outfit, and they have to live up to all the terms and conditions of the one company which produced this instrument.

Senator LONG. Your point is the company has paid—the company has been paid the money to develop this piece of equipment.

Mr. STERN. That is correct.

Senator LONG. And yet after the Government had paid to develop the entire piece of equipment, all parts, and the instruments to test it, the Government has permitted the manufacturer to secure a monopoly on all these items.

Mr. STERN. That is correct.

Senator LONG. And, naturally, the Government cannot expect to get nearly as good a price as it would if this manufacturer had bid for the business with someone who was in position to compete?

Mr. STERN. That is the purpose of maintaining this monopoly.

Senator LONG. You feel that if your recommendations were followed, I take it, that the Government could get better prices and better service?

Mr. STERN. Better prices, better delivery, better service.

Senator LONG. And more competition?

Mr. STERN. And more competition, and it would allow small businesses such as ours to remain competitive.

Fortunately, we are still operating because there are companies like Jack & Heintz and others which I have listed who are, well, I would not say conscientious perhaps, but who realize what control they can exercise, but do not take advantage of it, and cooperate by selling us parts and, of course, there are other companies that sell us parts.

Senator LONG. Did you make a statement that the original manufacturer oftentimes charges 2 to 10 times what you charge for the same service?

Mr. STERN. That is correct.

Senator LONG. Can you provide us with some specific examples of this?

Mr. STERN. Well, I would say this, that the Government files are rather complete, and since many of these proposals are negotiated, we never learn who ultimately receives the award, and we do not know what the competing prices are.

But in the instances where we had the experience, we know they were four times our price.

Senator LONG. When you did get the experience, your competitor was four times your price?

Mr. STERN. That is right.

Senator LONG. Could you be more specific than that now and tell me who the competitor was?

Mr. STERN. It was General Electric Co.

Senator LONG. General Electric?

Mr. STERN. That if you go to Olmstead Air Force Base——

Senator LONG. What was the job in that instance?

Mr. STERN. Different types. There are so many numerous types——

Senator LONG. A matter of repairing aircraft instruments?

Mr. STERN. Yes, repairing.

Senator LONG. Repairing and overhauling an aircraft instrument?
Mr. STERN. Yes.

Senator LONG. Did you succeed in getting the business on that occasion?

Mr. STERN. Well, we received—we had the instruments; yes. You see we have ingenuity in small business, and we are able in many cases to ascertain from the application of this instrument and from the technical order certain data which we can put together and experiment with until we get the final results which, of course, is not the most desirable way of doing it.

The most desirable way, of course, is to get the schematics and the designs for which the Government has already paid, and which would enable us to give a better price yet than what we do, but there is always that big question mark as to what will the test equipment cost us in testing these aircraft instruments.

We are able in many cases to package our own test equipment and that is one reason why we are still in business today. However, you would say that a large percentage of this overhaul, the instrument overhaul, and repair is still based in the hands of a few larger companies, and I think that the one important factor out of this entire report that I have given—the thing that I think you should stress—is that the larger companies should either give up the overhaul business entirely, or give up the designs and the parts or give such information over to the Government as is necessary for small business to compete with it.

Otherwise, you will have a condition which is absolutely untenable, as I pointed out in my report, where a small business has no opportunity but merely to forget entirely about competing with these larger companies.

This is not true of all companies. I am not here to say this is true of all. But many of the new instruments being developed today are in that category, and unless your committee does something about it, I think it will continue to get worse.

Senator LONG. We hear a lot about these weapons systems. You probably heard a previous witness say that because of the way things are developing, he doubts that there is going to be any place for his business in supplying the Government with cameras or lenses.

Can you see that situation, the trend moving in that direction?

Mr. STERN. Well, we do missile work, mostly in fuses and, of course, most of our work is done primarily directly with the Government. We do not do too much subcontract work.

However, I have attended a number of meetings of small business on research and development, and one of the subjects brought up was the idea of missile systems, and there was no definite conclusion except that there are certain facets of the missile system, that is of the entire system, which could be very well handled by small businesses, and the decision, the ultimate decision, should not be in the hands of one large company that has this missile system.

I think there should be men in the Government, qualified personnel, who can determine from the system itself what phases of this system could be handled by small business.

In the case of Mr. Peirez and the cameras, I am sure the Government will say, "Well, now, we want this reflex or whatever the name of his

company is, to handle this particular camera, and we want this to be handled by another small"—perhaps not by his company, but by small business, and the system can be broken up to a certain extent where small business can participate.

However, the way it is set up now, the voice regarding where the business is to go is strictly in the hands of one large company which has control of this weapons system, and I do not think the Government does in any way give suggestions or recommendations.

Senator LONG. Wouldn't it seem to you that if a law insisted that there should be competitive bidding, a contracting officer could just insist as a condition of——

Mr. STERN. Of his original proposal.

Senator LONG. A company, as a prerequisite for securing a research and development contract, would have to promise to share that information with at least several appropriate competitors who would like to bid on that business, and those people would have to make available the information which the competitors felt they needed to build the system?

Mr. STERN. That is right. In other words, if they were on a committee, whether it be Government personnel or whether it be men from private industry who worked on this committtee, who have the technical know-how, they could sit on this committee during certain periods and go over the system, and they are in a good position, along with Government personnel, to designate which facets or which of the phases of this missile system could be adequately handled by small business, and have the larger missile systems manufacturers, the ones who have the control, be forced to give certain phases of it to small business competitively, not merely to hand it to them.

Senator LONG. If you do not object too much, Mr. Stern, I would like to have you come back after lunch and have committee counsel ask you some questions.

I have asked the questions I had in mind.

We will now recess this meeting until 2 o'clock.

(Whereupon, at 12:55 p.m., a recess was taken, to reconvene at 2 p.m. the same day.)

AFTERNOON SESSION

Senator LONG. All right, are you ready to proceed?

STATEMENT OF HARRY STERN—Resumed

Mr. GORDON. Your difficulty, according to your statement, is the inability to secure replacement parts and/or test equipment required to meet Goverment delivery dates; is that correct?

Mr. STERN. That is one of the problems.

Mr. GORDON. Which company manufacturers the items you are trying to get?

Mr. STERN. Well, there are a number of companies. I have listed here about 10, although I would say there are probably upwards of 25 or more in the field including parts-distributors, which I have not listed.

Mr. GORDON. Could you supply those for the record, please? I do not mean right now, but subsequently.

Mr. STERN. All right, I will make a note.[4]

Mr. GORDON. Do you know if they were developed by these companies under Government sponsorship?

Mr. STERN. Well, I would certainly believe that the only way they could possibly be developed would be under such sponsorship, because it is not a consumer item, and the original use would be for Government military equipment. Consequently, it would follow the normal research and development pattern of Government equipment, and that would be where the Government pays for the research and development, and afterwards procures the end item, normally from the manufacturer who develops this particular instrument.

Mr. GORDON. When the companies tell you that these are proprietary items, what precisely does that mean? Does it mean they have patents on the items?

Mr. STERN. Proprietary to me implies that they have borne the cost of development of this particular item, and that all the know-how and development, research, belongs to them and, consequently, they have no desire to issue any know-how regarding the manufacture of these items, nor in financing the test equipment required for testing these particular items.

Mr. GORDON. Then the implication is that they themselves have paid to develop this knowledge and technical know-how?

Mr. STERN. Yes, sir.

Mr. GORDON. Do these companies refuse to sell you the item, or do they give you very long delivery dates?

Mr. STERN. They usually—it would be both.

Mr. GORDON. Both?

Mr. STERN. In other words, they can refuse to sell us the items. I think you can see in our exhibits [4a] where they refused to sell us any parts, or they can refuse to sell us the test equipment, or they can give delivery dates which are beyond the dates of the requirements of the Goverment which would, in essence, have no value.

In other words, for all practical purposes, they cannot supply these parts, or they will not supply these parts.

Mr. GORDON. Have you lost any Government business on that account?

Mr. STERN. Oh, yes; we have lost a considerable amount of Government business because of this.

Mr. GORDON. Who, generally, got the business?

Mr. STERN. We have tried to ascertain who received most of the business, but we assume from our own experiences that the companies from whom we try to purchase parts, normally receive the overhaul contracts.

Mr. GORDON. Would you conclude then that the claim of proprietary rights puts you at a great competitive disadvantage?

Mr. STERN. Well, not only at a disadvantage, but places us in a position where we cannot bid competitively at all on many of these instruments.

Mr. GORDON. Wouldn't you say that another disadvantage you would have is that these companies have developed the items on

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[4] See exhibit II(F), p. 49.
[4a] See exhibit II (A–F) beginning p. 49.

which you are competing with them, so they have all the know-how of manufacture?

Mr. STERN. They have the know-how of manufacturing.

But what we are concerned with is the manuals wherein they issue the information to the Government in conjunction with and in connection with the instruments which they supply the Government. This is normally required by contract.

Now, these manuals are designed to help the Government and private companies overhaul these aircraft instruments, strictly based on the information given in technical manuals.

This also means that equipment in the field, if it is, for example, let us say, in Okinawa, or in Japan or someplace, should be able to be overhauled by military personnel strictly on the information given in the manuals.

We find, however, that these manuals are incomplete. Whether they are inadvertentaly so, or whether it was done purposely, I am not in position to say, but I will say that these manuals which are supposed to be complete are furnished the Government in many cases incomplete, and recourse has to be made to the original manufacturer to fill in this information which is missing.

This is where we run into our problem, because the original manufacturer in many cases, in most cases, will not release this missing information, which is normally test equipment.

Mr. GORDON. Test equipment?

Mr. STERN. Test equipment design and in many cases they refuse to sell us these parts which are required to overhaul this equipment.

Yet the Government has paid for this research and development, and is entitled to all the information necessary to overhaul these instruments and to obtain the spare parts and test equipment.

Mr. GORDON. Well, I think you have answered my next question I was going to ask you, which was if you had any difficulty securing designs and parts drawings and other data which you need.

Mr. STERN. Well, we just simply cannot obtain parts designs at all. Our contracts are based on a cost of material, which is the exact cost to the Government plus a charge, a fixed price for labor and overhead.

Now, the cost of these parts is determined, of course, or is determined by the manufacturer of these parts. We never question the cost of these parts, although they may be excessive, and we are not in position to question the costs.

However, we are not debating that. We are not worried about the purchase of the parts, if we could obtain them, or the cost.

But in many cases the instrument manufacturer claims that they are his rights, his designs, and he refuses in many cases to sell us these parts, which means that we cannot overhaul the instrument, nor can we bid.

Mr. GORDON. Would it be fair to say that these companies are, with title to the items you need, in position to put you out of business if they desire to do so, by either refusing to sell you items, as some have done, or by prolonging delivery dates, as some also have done?

Mr. STERN. Well, they can put us out of business regarding the instruments which they develop, and that may represent as high as 50 percent of the aircraft instruments which are presently being furnished the Government or have been furnished the Government.

It would certainly place a hardship to the extent that it is questionable whether small business can exist much longer, if the larger companies who have this know-how continue to refuse to turn over this information to the contractor or to the overhaul shop upon request of the Government.

Now, the Government also finds difficulty in finding this information, so it is not strictly a question of trying to get this information through the Government.

The Government has tried to assist us and has found it difficult to get this information from these manufacturers who continually say that they have proprietary rights.

Of course, sometimes you wonder why the Government would be inclined to believe—why they would not force this issue, since there is no question about the development of these items having been paid for by the Government.

It is a matter of looking into the records and merely claiming what actually belongs to the Government.

Mr. GORDON. Would you say that this is an especially intolerable situation when these companies have exclusive rights to those items developed at Government expense?

Mr. STERN. What was that question again, please?

Mr. GORDON. Would you say this is an especially intolerable situation particularly if the title is to an item which had been developed at Government expense?

Mr. STERN. Well, as far as the small businessman is concerned, this is an intolerable situation.

As far as the Government is concerned, I think the Government should consider it also an intolerable situation, and that steps should certainly be taken to insure not only future procurement but all those procurements which have been made in the past, that all this information be furnished by the various manufacturers upon request by the Government, and that, I believe, that there is sufficient, well, sufficient reason or sufficient claims made in the contract itself, whereby the Government can insist.

In other words, upon the insistence of the Government or upon a little research work on the part of the Government, I believe they will find in the original contracts that they certainly own all these rights, and that it is a question of actually doing a little spadework and exercising their privileges and rights that the Government as, I believe, already established in the original contract.

It is the pursuing a little further what the Government already has a right to do, and I think they could persuade, very easily persuade, many of these companies to part with that information which they claim as proprietary rights.

Mr. GORDON. There is also a problem of giving title to the patents.

Mr. STERN. Title to what?

Mr. GORDON. Title to certain patent rights which have been developed at Government expense that they claim proprietary rights to.

Mr. STERN. Well, I mean the Government reserves the right, if the patent has been developed at Government expense, the Government has a right, I believe, when it comes, for example, in our type of work, instrument overhaul, to permit other companies to do the work directly for the Government if the Government owns these patents, since they have been established with Government money.

We are not doing this work for private concerns, but strictly for the Government.

Consequently, if a patent has been developed and, of course, in the course of the research and development of an instrument, it belongs to the Government—although in the overhaul phase I would not consider it an infringement, because you are not actually building it but overhauling it, and you are not doing it for sale to private industry but you are doing it for the Government.

Mr. GORDON. You said that when you were able to get the Government to intercede for you, you were able to get the delivery on a particular item cut down from 6 months to 10 days. Do you remember that?

Mr. STERN. In one instance, yes.

Mr. GORDON. Would this not be an indication that if they had been so disposed they could have given you the 10-day delivery date in the first place?

Mr. STERN. That is correct.

Senator LONG. Let me ask you this question: So far as you are concerned does not the effect of these patents and these proprietary positions actually amount to a monopoly granted against the Government; the Government granting a monopoly against the Government?

In other words, the Government cannot get weapons repaired and overhauled at a reasonable cost because it permits a person who has been paid to develop the instruments to have a monopoly against the Government?

Mr. STERN. That is what it amounts to, in essence, Senator. Actually, it is similar to——

Senator LONG. The actual effect is that the proprietary rights for which the Government has paid can be used to impede national defense.

The Government has said: "We will pay you to develop something for national defense, but we will grant you the right to say that this thing is not developed except for your profit."

Mr. STERN. That is right.

It is similar to the case the gentleman before me spoke of where the Government has paid for the development, and the Government is again paying a royalty on top of the development costs.

Senator LONG. The Government bought it, the Government paid for it, but the Government cannot get the best use of it because, having paid it, it now permits the fellow from whom they bought it to appropriate unto himself and have a monopoly in it against the Government.

Mr. STERN. Obtained proprietary rights, and actually to have a monopoly which, of course, creates the problem again of where the Government has to go back to the original manufacturer and pay under his terms and under his conditions.

The purpose, of course, for my being here is to try to point out the inequity of having a company develop an instrument with Government funds and then making it difficult for the Government to have it overhauled.

Senator LONG. Yes.

Mr. STERN. Have it overhauled by any other company but the company that originally developed it.

You may ask: Does the company have more know-how, the company which developed it, than any other companies that can overhaul it?

I would say no, because in giving the instrument to the Government, they have to supply with it a manual which is to describe all the methods and all the test equipment necessary to overhaul it, so that it could be done independently in the field.

Now, if any information is missing then they have not supplied sufficient information to the Government.

So the Government can always go back and say, "Now, look you have designated a piece of test equipment in here to test this particular aircraft instrument. Why don't you supply us with the drawings and diagrams of this equipment so that it can be built?"

Their claim might well be, "Well, that is a proprietary item."

Well, the next step, of course, the Government should say, "How can it be a proprietary item if we paid you for developing this instrument, and you developed this test equipment as a result of the instrument which we paid you for, and which we also paid you for the development of the equipment."

Now, if this were pressed a little further, I think you will find that the contractor who originally made the aircraft instruments did not live up to the actual contractual requirements, and that he has either deliberately or inadvertently left out certain information which should have been given to the Government, which should allow other companies to overhaul this instrument, and if we, as a small business, find that there is not sufficient information in this technical manual to overhaul this instrument, that means the Government has been shortchanged, that they had not been given all the information that they required.

By leaving out certain information in this manual and by making reference to their own GE number of whatever number they want, and making the Government go back to them they are, in essence, controlling the—they have the monopoly.[4b]

Senator LONG. But that can be a very profitable business, shortchanging the Government, can it not?

Mr. STERN. I guess it can.

Mr. ANSBERRY. Mr. Stern, do you know how much money is involved annually in the repair of aircraft equipment?

Mr. STERN. I would like to point out, I could guess, but I would say upward of $100 million.

Now, you say that is a lot of money or, perhaps, you say it is a little money so far as instruments.

But I would like to point out that aircraft not only have as major components aircraft instruments, but also they require that accessories, such as generators and motors, be overhauled, and they require that pumps and actuators be overhauled.

They require many other instruments, and many accessories that go into aircraft, and also cameras, which have been referred to. We do camera work, overhaul cameras, which also represents a large portion of this overhaul business.

So it could actually be larger than the $100 million. But I am not in position to give an exact figure.

[4b] See G.E. statement, App. X, p. 435.

I would say it is substantial as far as small business is concerned, and obviously as far as large business is concerned.

Mr. GORDON. Do you believe that present policies are actually slowing down the Government overall research efforts in our country's technological advance?

What is your opinion of this very broad and profound question?

Mr. STERN. Well, that is a very big question, but I will say that from my experience there should be more Government control exercised in the administration of some of these large contracts, and I believe that if the proper technical people were in the employ of the Government—and I am not casting any reflections on Government employees—but if there were men who were sufficiently experienced in this particular field, they could monitor a lot of this work that is going out to private industry. You would find that you can channel much of this business into the hands of small business.

In reply to the question you had given me before lunch, I would like to say it is my belief that if a panel of small businessmen were selected from various industries, from electronics, from instrumentation, and from many other fields, were permitted to sit in on some of these discussions regarding these large weapons systems as to what aspect or phase of this system could be handled by small business, I believe you will find much of this could be handled and could be channeled into small business.

The missile system is not necessarily a problem of one large company, but could be channeled into the hands of many small companies.

Mr. GORDON. Let me ask you this: Suppose the Government had taken title to those items you are repairing and then, put it all in the public domain, that is, dedicated it to the public? All the data, of course, would be available to you or to anyone else.

How would your business be affected when you would have no difficulty in securing this data—when all this data would be available to all?

Mr. STERN. I would say, first of all, it would certainly decrease the prices we would be giving the Government.

Mr. GORDON. You mean it would decrease prices by increasing the competition?

Mr. STERN. It would provide lower prices to the Government by increasing competition.

It would also give better delivery dates and, of course, it would permit many small businesses to exist which could not exist under the present setup.

Mr. GORDON. This is a very important question: Would you venture to say that giving title by the Government to a firm, large or small, for a key item, could possibly give to the firm the power of life or death over other firms, like your firm, for example?

Mr. STERN. It is conceivable. It is very conceivable that it happens, and it probably very well could, and I would say it also has happened that the control of the instruments from the point of development to the point of overhauling, if kept in the hands of one large company, could very well put many small businesses out of business, and it probably has.

Mr. GORDON. Would you think that this kind of a situation is consistent with our antitrust policy?

Mr. STERN. Well, I am not a lawyer, but I would assume that a monopoly is a form of a trust, and that any effort on the part of large business to restrain or to prevent competition in the field for an item from which they have been paid, and which is public property, would naturally be a monopoly or a situation similar to a trust.

Senator LONG. I want to get your reaction to one or two statements, which I shall read from a statement of a subsequent witness. I do not usually do this.

I myself have complained at times that some Senator would comment on my prepared speech before I ever had a chance to deliver it. I think, however, that this could expedite the hearings if we could get your reaction to this statement. The subsequent witness could then express his reaction to your reaction to his statement.

Here is the statement:

> Small businesses are in most instances dependent upon a proprietary position of some sort, whether it be patents or unique know-how, for their continued existence and future growth. They could not survive and grow if forced to compete with so-called big business in an open and freely competitive market.

To repeat that statement, and I will read the first sentence of it again:

> Small businesses are in most instances dependent upon a proprietary position of some sort, whether it be patents or unique know-how, for their continued existence and future growth.

What that means is this—and let us apply it to your particular case—Are you dependent upon a patent or upon certain know-how which you can exclude others from using, to maintain your position in your industry?

Mr. STERN. I would say no.

I would say that know-how is one phase or one aspect of a business, but I would say the type of administration, efficiency, drive, aggressiveness, all are important.

A patent is not the backbone of most small businesses. I think it depends a lot upon the individual running the business and many personal traits, which have a lot to do with the functioning of business.

Senator LONG. It just occurs to me that on occasion I have learned something by hiring someone from another Senator's office. If a fellow who ran a good office was defeated it is not a bad idea to hire somebody from his office who happened to have special skills and to learn something that you did not know before, so you can do things better in your own office.

But, so far as I know, none of us have any proprietary position there, and there is nothing that any of us know that we can forbid the other guy from using.

If one fellow does something well you are always trying to find out how he does it so you can do your work better.

Mr. STERN. That is right.

Senator LONG. But we do not have a proprietary position.

I would just be curious to know your reaction. As I understand your answer, then, you do not feel that the statement is correct that small business—at least the small businesses you know—have to depend upon a proprietary position that is a protective right to prevent the other fellow from doing business or upon a patent, in order to continue to exist and grow?

Mr. STERN. No. I would say that the ability for a small business to exist may be in his ingenuity to produce an item less expensively than some other company who can see very well the item in front of him, but who cannot compete so far as price, because this other company has developed ingenuity in the production of his item, not necessarily a proprietorship, has a proprietary right, or has a patent.

But the unique method of producing this item or his unique ability to create sales, as I point out, personal traits as salesmanship, his ability to get this product on the market, have more to do with the success of a small business than a patent.

Senator LONG. Here is the second sentence of that paragraph:

> They could not survive and grow if forced to compete with so-called big business in an open, freely competitive market.

Do you agree with that statement?

Mr. STERN. I interpret his statement as meaning that small business requires some protection in order to exist.

Senator LONG. Yes; some kind of a patent protection or protection of know-how.

Mr. STERN. No; I would say if small business were permitted to compete with large business on an equal basis, small business would continue to grow larger, and there would be more small businesses.

Senator LONG. I tend to agree with you, that while this statement may prevail on big business—they can contradict you and me if they want to when they testify—both parts of the statement do not conform to facts.

Mr. STERN. That is correct.

Senator LONG. One of the advantages of small business as against big business is that the boss is right on top of the business at all times.

Mr. STERN. That is correct.

Senator LONG. In your business you have 150 employees, and when you run into a problem you are in direct contact with each one. If your technician cannot lick it, you can try to lick it yourself.

Mr. STERN. I know each one of them by name; I know their personal problems, and I work with them.

Senator LONG. And you know what they can do.

Mr. STERN. What they can do, and we offer them incentive, whereas large companies can not.

We offer them more money for their work. We give individual treatment as individuals, and, as a result, we have people willing to stay in our company rather than to go with the larger companies. The present tendency is for many large businesses to decentralize for that very reason, because they have lost their contact with the individuals with whom they work.

So the success of a small company is based on other factors rather than the protection by proprietary items or patents.

If small business were allowed to compete, were given the same opportunity as large business, small business would not complain nor would they seek the shelter of Government.

Small business merely wants the opportunity and the right to compete on an equal basis with large business, and that is the only basis upon which small business would seek help. They do not require any special Government protection.

Senator LONG. There are a great number of advantages that big business has, of course, but my impression is that the principal advantage that the average small business has is the ability of the manager of that business to look after his customers with personal attention.

Mr. STERN. That is right.

Senator LONG. Take it right down to the corner grocery store: A single customer is very important to the small grocer. If he fails to have on his shelf what a customer asks for, even though he is limited to a small number of commodities, it is his business to go out and get the commodity and have it there for that particular customer when he comes around for it.

Mr. STERN. That is right.

Senator LONG. And while he may be able to merchandise only a small amount of commodities, he works very hard in trying to serve that particular customer because it is so very important. Big business cannot give the kind of special, individual attention to its customers that small business gives.

Mr. STERN. That is right. That is the philosophy of small business. On that basis small business can exist, and we ourselves look upon a contract, which normally would not be of interest to many large companies, as a substantial contract. We work on a much lower overhead, on a much lower profit, and we work a little bit harder than some individuals working in larger companies. But we are satisfied so long as we can compete on an equal basis.

But if we are strapped, and the Government is strapped, and the Government cannot give us any assistance for items for which they have already paid, as previously mentioned, then there is no recourse but to go out of business.

I hope that as a result of these hearings we are now having something will be done to recognize the problems of small business. It is important that through legislation definite procurement policies be established. Also those policies which have been practiced in the past be gone into a little more thoroughly.

I think a lot of the situations can be rectified without any further change in procurement policy that we already have in contracts which have already been completed, sufficient reason to go back to many of these larger companies and request the information which has been withheld in the first place.

I feel that we could immediately, as well as other businesses, compete with the largest companies, merely upon the Government insisting, on its legal rights to obtain from these larger companies that for which they have already paid.

Senator LONG. Your testimony provides me with a suggestion for some legislation which is certainly worth considering and that is, that when these manuals are incomplete, and if they fail to carry the necessary information to fulfill under the contract, you fellows ought to be able to recover treble damages for what you lose because their manuals are incomplete. I imagine those manuals would then be much more accurate and complete in the future.

Mr. STERN. That is right.

If these manuals were completed, the information is there within the confines of the company's library or wherever they maintain their information, and they have this test-equipment know-how and design,

and it is a question of the Government's insisting that they complete this manual; that what the Government has purchased is incomplete, and that the Government has paid for something they have not received, and that it is creating not only a problem as far as jeopardizing our security, but it is causing Uncle Sam to pay much higher costs, and wait for the delivery and wait for the terms and conditions of these larger manufacturers.

Senator LONG. This thought occurs to me, too: The purpose of that manual primarily is not for a company like yours, but for the boy out in the field, and if that fellow was out there in Okinawa and a war breaks out and the lives of this Nation are dependent upon the use of that manual, if the manual is incomplete that could very well cost this Nation considerably.

Mr. STERN. It would create a problem—I would not be in position to say—but this is a situation where there may be someplace in their archives where this may have happened, and, of course, I am not in position to say whether it has happened, but it is conceivable that it may have happened in the past.

Senator LONG. Let me ask you something else. Have you ever had any Government research contracts yourself?

Mr. STERN. We have on a very limited basis. Most of our contracts have been on a fixed-price type of a contract.

Senator LONG. Fixed price?

Mr. STERN. Fixed price.

Senator LONG. They pay you a certain amount to do a certain amount of research?

Mr. STERN. To do a certain job.

We also have had, as brought out by previous speakers, contracts with redetermination clauses in them which meant we were to produce the item, and with a fixed price, plus or minum 10 percent, but we had a fixed price to go by.

We never really had any contracts on a cost-plus basis.

Senator LONG. I see.

Have you had a research-and-development type contract where you are supposed to develop something?

Mr. STERN. We have had it, but not on a cost-plus basis, but fixed-price basis.

Senator LONG. What type of a contract would that be? Could you give me a general idea, without divulging any secret information on that?

Mr. STERN. Well, we have developed a fuse, helped in working with the Government here in Washington.

Senator LONG. How do they do it? Do they say they would pay you X amount of dollars to develop a certain type fuse for a certain purpose?

Mr. STERN. Well, actually the fuse had been partially developed, and we completed development. We were paid for it by a fixed price for the development and for the development of a prototype fuse.

Senator LONG. When you got that you did not know whether you could produce it or not, but you hoped you could?

Mr. STERN. We felt we could, and we did. We are working now on a contract on the same basis.

Senator LONG. I see.

Mr. STERN. In other words, we knew, we could see it was not that involved so that we could not see what work was required to complete the development.

Senator LONG. Do you have any proprietary rights in that patent?

Mr. STERN. No, we do not.

Senator LONG. Do you expect it? Do you think you would be entitled to it?

Mr. STERN. No, we do not. We think it is entirely of military value, and certainly has been developed at Government expense and, therefore, it belongs in total to the Government.

Senator LONG. So far as you are concerned, you were paid to do it, and you got the same advantage that the previous witness referred to. You had the advantage of being the first one in the field. You had the advantage of getting those contracts, and you thought you could make a profit on them. You are also willing to compete with the other people who may want to produce the item, isn't that right?

Mr. STERN. Yes. We think we have sufficient know-how to warrant our further consideration in the development of any of these programs, because it is to the interest of the Government to include us because of our know-how, which is a selling point, and it enables us to sell the Government the idea of giving the contract to us in lieu of giving it to somebody else because of our know-how.

Senator LONG. Thank you, sir, very much.

Mr. STERN. Thank you, Senator.

(Mr. Stern's letter and prepared statement follow:)

LETTER WITH ACCOMPANYING PREPARED STATEMENT OF HARRY STERN, PRESIDENT, ACTION MANUFACTURING CO., PHILADELPHIA, PA.

DECEMBER 5, 1959.

SELECT COMMITTEE ON SMALL BUSINESS,
Old Senate Office Building, Washington, D.C.

(Attention of Mr. B. Gordon, economist, Small Business Committee.)

GENTLEMEN: Enclosed is a statement written by Mr. Harry Stern, president of Action Manufacturing Co., regarding his own personal experiences and some suggestions to remedy the situation regarding proprietary rights primarily claimed by large business. These proprietary claims have seriously affected and hampered the success and progress of our aircraft overhaul shop and consequently the enclosed statement has been compiled.

Due to the short period of time allowed me for this statement, in conjunction with the fact that as a small businessman I had to neglect some of my other duties to prepare this statement, it is not as complete and as thorough as it should be considering the importance of rectifying this condition regarding our business.

However, I will be very happy to complete any other information following the hearings.

Very truly yours,

ACTION MANUFACTURING CO.,
HARRY STERN, *President.*

Action Manufacturing Co. is a small business situated in the northeast section of Philadelphia and employing approximately 125 men and women. We are primarily engaged in producing electromechanical mechanisms and instruments and in the overhaul and repair of aircraft instruments. Our business was established in 1946 and has been operating since this inception.

The president and writer of this statement, namely, Harry Stern, is a journeyman toolmaker and a graduate mechanical engineer.

The purpose of this report is to bring to the attention of the proper people the difficulties experienced by our company, as well as other small businesses, in competing with the original manufacturers of aircraft instruments for the

overhaul and repair of these aircraft instruments. The major reasons for our inability to compete in the overhaul and repair of certain instruments is due to the difficulty or impossibility of obtaining replacement parts and/or test equipment to meet the required Government delivery dates. Failure to meet the Government delivery dates has been the basis for rejecting our proposals or proposals by manufacturers in the same situation as our company. As a result of the long delivery dates promised by the manufacturers of these instruments who are in the only position to supply these parts and test equipment and due to the claim of some of these manufacturers that they have proprietary rights, a situation exists which is untenable so far as we are concerned. This claim of proprietary rights either results in an outright rejection to sell replacement parts and/or test equipment or the delayed delivery seems purposely designed to cause rejection of our proposal by the Government who has previously established the required delivery dates.

We believe that the Government has financed the majority (if not all) research and development work on the aircraft instruments for which we are trying to receive contracts for the overhaul and repair and that the claim of proprietary rights are strictly in the hands of the Government. It is inconceivable that any company would or could undertake the expenditures of millions in the development of an aircraft instrument based on the hopes of ultimately selling it to the Government or private industry. We believe that all of this research and development would be contracted by the Government through prime or subcontracts and therefore all developments, designs, parts drawings, tooling, specifications, test deigns, and test equipment, all belong to the Government and, if not turned over to the Government completely, should be available upon Government request on the behalf of the Government or on the behalf of an aircraft instrument overhaul shop contracted to do the overhaul and repair for the Government.

A monopoly in this situation is a simple matter where the manufacturer of the original equipment controls both the parts manufacturing and the retention of the best equipment design because any aircraft instrument overhaul shop would have to go to these firms and these firms only to purchase all parts and test equipment. By giving the overhaul shop unrealistic deliveries (if any) and by establishing exhorbitant prices for their test equipment, if they entertain any desire at all to sell this equipment, they automatically disqualify any overhaul shop other than their own due to the inability of their competitors to obtain parts or equipment on time to meet the required deliveries. (See Kollsman Instrument Corp. letter dated August 18, 1959 and our letter to them dated July 13, 1959.)

This maneuver by certain of the original equipment manufacturers does not permit any company to compete with them for the overhaul of aircraft instruments if they wish to evercise the advantage of their monopoly. For, by forcing the Government to disqualify all bidders due to the inability of the small business firms to obtain the necessary repair parts, components, or test equipment from the only and single source, they alone can receive the award. It is therefore obvious that either the original equipment manufacturer should (1)—not overhaul instruments or (2) not manufacture parts or (3) turn over the parts prints to the Government (which has normally been paid for by the Government) for reissuances to other manufacturers so that they can produce the parts and test equipment competitively.

The original instrument manufacturer should be forced to compete on both the furnishing of parts and test equipment in the overhaul phase, although it is the writer's belief that small business concerns can do a much more effective job in the overhaul and repair of aircraft instruments and other instruments from both the delivery and cost factors. Also it is my belief that the Government should receive all the data for which it has paid and the rights to go back to the original manufacturer, in order to obtain any and all information inadvertently left out of the Tech Order manuals giving details on the overhaul and repair of these instruments as part of the original package. This information should be made available to the competing instrument overhaul shops at no cost so that in preparing a bid the instrument overhaul shops can give firm and fair prices. Furthermore, parts prints should be made available at all times so that the original manufacturer is forced to compete with other parts sources. Test equipment design (and test equipment made by the manufacturer with Government funds) should be available at all times so that the Government can be assured a competitive price and a reasonable delivery. In other words, once the Government has procured the original overhaul instru-

ment or instruments from the instrument manufacturer all know-how, equipment, design, and subsequent changes and improvements should become the property of the Government and be made available to firms interested in the repair and overhaul of aircraft instruments, where it is in the interest of the Government to do so. The claims of proprietary rights by many manufacturers is not valid and if checked into carefully, regarding the means by which these so-called proprietary rights were developed, would reveal in many cases that this company does not have any proprietary rights and that all proprietary rights rest with the Government.

The claim of proprietary rights creates a monopoly, tends to eliminate all competition and places the Government in a position to accept all terms and conditions established by the original instrument manufacturer. This contributes to higher costs, longer deliveries and may jeopardize the security of our Nation. Furthermore, this monopoly created by a claim of proprietary rights forces the Government to go back to the original manufacturer who can name his own price, his own conditions, and his own delivery, if at all interested in doing so. It can force the Government to give them all its overhaul and repair work at the price and conditions they name. But, the effect on small business is absolutely devastating and in many cases catastrophic because there is no opportunity for the small business to compete with all the odds stacked against it.

Enclosed is attachment A,[1] illustrating a typical claim of proprietary item which is in reply to our letter dated 13 July and marked attachment B. Attachment C is a typical answer to our request for quote on aircraft instrument parts from the original manufacturer. Experience has shown that in many cases where Government assistance is solicited by us we can obtain delivery within 10 days where original promises were made for delivery within 6 months. Attachment D is a statement submitted to small business with our Certificate of Competency form after having been rejected by the Air Force office for our inability to meet required delivery on the proposal and attachment E is a copy of rejection given us by small business which was based on our inability to obtain parts and test equipment from General Electric Co. in sufficient time to meet the deliveries. Although we were the low bidder we were disqualified. Attachment F is a list of some firms who have refused to cooperate with us in obtaining parts and test equipment and some firms who have cooperated with us in obtaining parts and test equipment.

Senator LONG. I am going to call as the next witness the representative of the Aerojet-General Corp.

We are pleased to have you here today, sir.

STATEMENT OF EMERSON S. REICHARD, JR., DIRECTOR OF CONTRACTS, AEROJET-GENERAL CORP., SACRAMENTO, CALIF., ACCOMPANIED BY ROBERT C. BROWN, PATENT COUNSEL, AZUSA, CALIF.

Mr. REICHARD. Thank you, Mr. Chairman.

Senator LONG. I suggest that you summarize your prepared statement. We will print your full statement in the record, if you will please summarize it for us.

Mr. REICHARD. I will be very happy to do that, Senator.

Mr. Chairman and gentlemen, I am Emerson S. Reichard, Jr., Director of Contracts of Aerojet-General Corp.

On behalf of Aerojet-General Corp. we wish to express our appreciation for the privilege of appearing before this subcommittee.

Our president, Dan Kimball, regrets that he is unable to attend.

I have with me Mr. Robert C. Brown, our patent counsel.

This committee is primarily concerned at this time with investigating the effect on small businesses, if any, of current policies for the dis-

[1] See exhibit II beginning p. 47.

position of patent rights in Government contracts for research and development.

Aerojet-General has been granted a total of 87 United States patents for inventions made or conceived in the course of Government-sponsored research and development work, and at the present time has about 250 pending patent applications for such inventions.

We have also had granted 23 patents, and have 57 patent applications pending, which were not invented under Government R. & D. programs.

At the very outset we wish to state that although a substantial amount of Government research and development funds appear to go to a relatively small number of large firms, we do not consider the amount disproportionate, at least in light of Aerojet-General's experience.

We would like to invite the committee's attention to the fact that an estimated 33 percent of all the research and development work obtained by Aerojet from the Government is subcontracted to small business.

We think that there are important reasons for the fact that most of the Governments research dollar goes to large businesses, but we do not feel that patent policies such as those of the Department of Defense are responsible for this fact.

Quite the contrary. In our opinion, an even greater proportion of R. & D. work would be left to the larger firms if the Department of Defense were to change its policies to conform with those of the Atomic Energy Commission, for example.

We think that the following factors are primarily responsible for what we term the lack of enthusiasm on the part of small businesses for research and development contracts with the Government.

First, these R. & D. contracts represent rather low profit margins, particularly if conducted on a cost-plus-fixed-fee basis.

Second, they do represent a rather high risk in the event of termination, and they do lack an assurance that production might result from the R. & D. effort.

Third, if production does result the Government's policy of requiring competitive bids, which is a policy with which we agree, often results in the award of contracts to companies solely for reasons such as cost, with due regard to overheads, but perhaps not enought attention to know-how or the ability to deliver the quality goods on time.

Patent policies such as those of the Department of Defense which permit the reservation of commercial rights in inventions made in the course of research and development contracts have had little to do with the distribution of research and development contracts, in our opinion.

We note that the Government in all of such contracts acquires at least a nonexclusive license which effectively prohibits the establishment of a monopoly in the defense field.

The commercial market for the usual space age development is all but nonexistent, at least in the immediate future.

While we do hope, as a company, that our patent position might enable us to expand into commercial fields at some future time, we have not yet realized any significant commercial advantage in our company from these as yet.

Of all of our patents and pending patent applications, only three are for commercial products. Two cover our two commercial JATO units, and a third such patent covers a pressure-sensing device on which a successful privately owned small business was founded.

In our opinion, the contractor's reservation of commercial rights in inventions made under research and development contracts has not been responsible to any appreciable extent for the growth of large business.

They are, however, an important inducement to small businesses.

If contractors are not permited to reserve such rights, it is our opinion that small businesses might suffer most, for they are much more dependent, we believe, upon proprietary rights than large concerns, whose continued existence and growth are assured by their greater financial resources, experience, know-how and overall capabilities.

Senator LONG. That last statement that you made is in conflict with what the previous witness testified, and I have been on this committee for a long time, and it does not square with my impression.

My impression is that very few small businesses depend upon patents for their existence.

Now, if we get down to know-how, I have not been under the impression that they depend upon any proprietary interest in know-how either.

I believe that most of the know-how small business has was readily achieved or found out by someone else, that most of the know-how is—there is no proprietary interest in it.

Mr. REICHARD. Senator, my statement was not intended to follow too strictly a legal sense when speaking of proprietary.

It involved the generalities of trade secrets or other know-how which might not necessarily be legally protected, because I was listening to the previous testimony, and I realized that, perhaps, the sentence in the prepared statement handed to the subcommittee might have so been misconstrued.

I would like to emphasize that our observations naturally stem largely from our own experience, having started out as a small business, and from our experience in dealing with small businesses as suppliers of ours.

In mentioning know-how or unique capability, I was bearing in mind that unique quality which a given organization can put to a given test in terms of administration or customer relations, personal services, which are a couple of item which you called attention to, I believe, in mentioning the corner grocery store.

Most of the major grocery chains in the country today began as small businesses also, but they had something a little more or a little better or something that the customer in a competitive field liked better, and this is what I had in mind when I was talking about, if you please, some sort of proprietary position which also embraces, in my mind, in its broad generality, a unique capability or know-how which is something better than the next fellow has.

The preceding witness mentioned——

Senator LONG. Consider an outfit like Sears Roebuck. From the time they started out, their objective was volume sales at a low profit.

Mr. REICHARD. Exactly.

Senator LONG. At low profit per unit, which turned out to be, I think, one of the finest things developed by American industry.

But there is no proprietary interest even in that. Anybody could use it.

Mr. REICHARD. True.

Senator LONG. It is just a matter of being smart enough and sharp enough so that you could keep the product moving at a low price and with a low profit on each unit.

Mr. REICHARD. Precisely. We certainly agree with that.

The preceding witness mentioned the fact that one element that keeps small business in business is the fact that maybe they got there first with a unique idea or a way of doing things which, as you brought out, if one Senator runs his office better than another, the one who wants to know about it can get the information because it really is not proprietary—it is an industrial technique, if you please, which is public domain.

Senator LONG. Yes.

Mr. REICHARD. Very many of the things that keep any business in business involve the same sort of thing. He has the advantage if he gets there first.

I would hasten to add that Aerojet's present position as large business does not stem from the fact that it holds a patent position to the exclusion of any other person doing what we do.

As a matter of fact, the particular type of business we are in, although we were very early in it, our company started in 1942, has found many more companies becoming quite interested in the same field, and we are not aware under the patent and data provisions under the contracts that we hold any bar to the Government's making our data available to other companies and, in fact, they have.

Senator LONG. Do I understand your company is engaged, for the most part, in defense activities?

Mr. REICHARD. Almost 100 percent; yes, sir.

Senator LONG. What are the percentages of your total sales to Government for 1956, 1957, 1958, and can you provide that?

Mr. REICHARD. I would say in each of those years over 99 percent.

Senator LONG. Over 99 percent.

What percentage of your total sales in 1942 or 1943 were made to the Government?

Mr. REICHARD. 100 percent.

Senator LONG. What was the value of your assets in 1942?

Mr. REICHARD. The company was started with a capital investment of $7,500, in March 1942.

Senator LONG. That is phenomenal.

Senator LONG. What would you say would be the value of your total assets now?

Mr. REICHARD. I believe our net worth is approximately $58 million.[4b]

Senator LONG. Is your corporation now an independent company or is it a subsidiary of another company?

Mr. REICHARD. Aerojet-General Corp. is a subsidiary of The General Tire and Rubber Co. The General Tire and Rubber Co. holds approximately 85 percent of the common stock of Aerojet.

[4b] See footnote No. 6, p. 83, for supplemental statement submitted by Mr. Reichard.

Senator LONG. Is General Tire one of the largest corporations in America or among the 100 largest?

Mr. REICHARD. I cannot tell you for sure. I believe that it may be, Senator. I have forgotten its position in the latest list.[5] I believe that it is.

Senator LONG. As I understand it the market appraisal of Aerojet is over $300 million; is that correct?

Mr. REICHARD. I did not get the first part of your question.

Senator LONG. It is my understanding that the market appraisal of Aerojet Corp. on the stock market is over $300 million; is that correct?

Mr. REICHARD. I believe that is approximately correct; yes, sir.

Senator LONG. The $58 million, I understand, would be the book value of your assets. If the patents are of no great value why would the market value of $300 million be so much greater than the book value?

Mr. REICHARD. We have a certain backlog of continuing business which, if the Government does not terminate it, we can anticipate business in hand continuing for us for a few years, and we certainly feel that we have a potential to acquire more of the same sort of work.

Senator LONG. In other words, if I understand your testimony here, you feel that most business does not rely upon patents—most large businesses do not rely upon patents and proprietary positions?

This $300 million is a very large figure. I would be curious to know why you feel that there is that much optimism in the market over your stock.

Mr. REICHARD. Well, I do not believe that sort of optimism stems from any patent holdings that we have.

We have found actually no practical monetary value from any of them as yet, and we ourselves do not anticipate them to be such in the immediate future.

Our work is so highly specialized in the defense field, and I believe that may account for the optimism.

Senator LONG. How about the value of the know-how, that is the advantages gained in working on these matters, do you think that would count in large measure for the optimism over your corporation?

Mr. REICHARD. I would think so. The hard core of our technical team has been with us almost since our very beginning and, as a working team of able people we think, perhaps, the people themselves, together with the unique facilities which we have constructed, represent a very significant asset, although it is very difficult to place a monetary value on it.

Senator LONG. When was your corporation acquired by General Tire?

Mr. REICHARD. General Tire first became interested in Aerojet in 1944, at which time they acquired approximately 50 percent of the holdings of Aerojet.

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[5] Excerpt from Mr. Reichard's letter of Dec. 16, 1958, to the committee amending statement: On p. 149 of the transcript appears the interchange between Senator Long and me on the ranking of the General Tire & Rubber Co. I have deleted the phrase in the testimony, "I think it is around 151st," but have ascertained the following information from two national magazines:

	Rank	
	1958	1957
Fortune—July 1959	84	92
News Front—April 1959	96	105

Senator LONG. Do you make or sell anything in the commercial market that is not a product sold to the Government?

Mr. REICHARD. I believe the answer to that is, no, Senator. We do sell JATO units on the commercial market, but they are almost identical to the same unit sold to the Government.

Senator LONG. You do sell some to private airlines, as well as the Government?

Mr. REICHARD. Yes, sir.

Senator LONG. You manufacture it for the Government, I take it?

Mr. REICHARD. Yes.

Senator LONG. And you have had some orders from private airlines I would assume?

Mr. REICHARD. I would say that is correct.

Mr. GORDON. Can you please give us some information about the zinc-chloride battery contract that amounts to about $5 million with the Signal Corps? This item seems to us to have some obvious commercial value to some of the cable companies.

Mr. REICHARD. Mr. Gordon, I am aware of the development which is under way. I am not aware of any significant anticipation or optimism within our company at all as to its commercial applications.

We have largely found that it has a rather substantial application in defense work. It certainly might at some future date have a commercial application.

I might draw an analogy which leads more closely to our primary field of business, which is rocket propulsion. We would hope that some day our rocket-type powerplants might apply to commercial transportation, but we see no immediate future for it.

Mr. GORDON. Do you manufacture cables for the Government?

Mr. REICHARD. No; we do not. The battery itself looks like a cable.

Mr. GORDON. I mean the batteries for these cables, booster batteries, is that what they are?

Mr. REICHARD. I am sorry, Mr. Gordon, I am not personally too familiar with this particular development.[5a]

It appears to have immediate application to a Government requirement and, as such, has not been produced in quantity. It is still under development. We hope that it has a bright future in defense applications.

Senator LONG. Could you give us a little more information about this growth from $7,500 up to a book value of $58 million? Was it because of profits plowed back into facilities that it now has a market value of $300 million? Were the surplus profits plowed back in or what?

Mr. REICHARD. All of our earnings or, I should say, substantially all of the earnings of Aerojet-General have been plowed back into facilities, and some private researches.

We have paid out of all of our earnings less than 4 percent since our inception, as dividends.

[5a] Supplemental information supplied by Mr. Reichard in letter dated Dec. 16, 1959, to the committee:

"There has not been and is no contract between the Signal Corps and Aerojet that amounts to about '$5 million' as suggested by Mr. Gordon. The development of this battery, which is shaped like a cable, was undertaken by the company without a contract. However, after 10 of these batteries had been made the Signal Corps bought the actual hardware from Aerojet on a fixed-price-purchase order for a complete total amount of $790."

We have not paid any dividends in the last few years, and we do not see any immediate opportunity to do so.

It is a highly technical business which we are in, and which requires advancing our facilities, because the facilities, too, are specialized, to keep up with technology, and as we see it right now, for the last 2 years our investment in facilities has been greater than our total earnings and depreciation, which has required us to go out and seek some new capital, actually.

Senator LONG. You say about 80 percent of your patents have been granted and applied for as a result of Government-financed research.

Would you give us some idea of where the other 20 percent came from or what type work is that on?

Mr. RICHARD. Some of these ,Senator, have been in connection with using rocket energy for oil well tooling, as well as defense-type products, in which we desired to undertake private research and see what we could come up with out of it. I mean, it was the sort of thing which the Government was not enthusiastic enough to buy, so we put some of our own money into it.

Another typical example is the swimmer propulsion unit which we developed on our own. This is a man-powered underwater submarine. You probably have seen it or heard of it, and it is more in connection with the line of defense business which we are in.

We have done some chemical researches which have gone into such items as cross-linking polyurethanes and I am reading this to you because I do not know what it means, but it is highly chemical, and applicable to solid rocket propellants.

Senator LONG. I see you have a long list there, and I am glad you came prepared.

If you have no objection we will just include that in the record as part of your statement without your having to read it.[5b]

Mr. REICHARD. I think it is all right. This includes all of the patent applications of our company.

Senator LONG. How many are there?

Mr. REICHARD. Senator, if I could ask your good offices, our patent counsel suggests that he would like to check each of these titles to be sure that the classified ones are not entered into your record, if I may.

Senator LONG. You can hand it back to us tomorrow if he wants to. We will be here tomorrow.

Mr. REICHARD. We will be most happy to give it to you.

Senator LONG. I believe you testified that only three of your patents have commercial significance at present. Do you happen to have a commercial market for more of them?

Mr. REICHARD. This is a natural hope of any business, that you might be able to establish a proprietary position in some field, which sort of puts you out ahead of the competition.

I gave three as an example of some 400-odd applications, to show you how insignificant our patent applications are, and have proved to be, with respect to commercial fields.

[5b] See exhibit III(A), p. 92, for summary of Aerojet-General Corp. issued patents and pending applications.

Senator LONG. Well, your company has, by doing business with the Government, multiplied in value by 4 million percent or 40,000 times in a period of 18 years.

It would appear to be a rather profitable business.

Do you think your company would be willing to go along with a policy that would let the Government retain proprietary rights in patentable items? It seems to me that if you can multiply 40,000 times in value exclusively on Government contracts, your corporation might be willing to forego some of the lesser advantages.

Mr. REICHARD. We, sir, agree that our business has been profitable. We would like it to be more profitable than it is.

Senator LONG. Don't you think that it would be a little bit optimistic to expect that you would grow 40,000 times larger in the next 18 years?

Mr. REICHARD. Frankly, we do not anticipate it. As a matter of fact, we did not anticipate this other growth that has taken place so far, when we started.

Actually, to get more directly to your question, the patent provisions which we have agreed to in all of our Government contracts are such that the Government naturally has a royalty-free, nonexclusive license to practice in any way in which the Government wishes any inventions or ideas which are first arrived at by the requirements of the contract in question.

We have in certain instances helped the Government out in areas where maybe even the patent clause did not directly apply, but we do not feel, considering the overall consideration for the services that we perform, that the Government is in an unfavorable position under the present patent clauses which the Defense Department is using.

Senator LONG. You have heard some testimony here today, I am sure, concerning the problems that some of these small business fellows have in obtaining the know-how. You are making large profits based on doing business almost exclusively with the Government. Would you not feel that know-how should be made clearly available to those who want to bid on Government contracts?

Mr. REICHARD. Yes, sir; and it is, to the best of my knowledge.

I am not aware of any specific instances where the Government has, having acquired under the terms of a contract the designs, the data, the patent disclosures applicable to a product, where the Government has not been able to use that information and it has, indeed, done so, to obtain bids from other people in developments which we originated.

I would like to again mention, as I had earlier, that in our dealings with our own suppliers that we also extend these same patent privileges to them so that should they make an invention they also retain the rights.

We sometimes ask a supplier if we might not also enjoy a royalty-free license for any such inventions, just as the Government asks us for it, and if they refuse it we do not insist upon it, and some of them have indeed refused it.

But they, at least, have the basic rights as a supplier under a Government prime, even though they are second or third tier, in exactly the same way the prime contractor does.

Senator LONG. Would you say that position is typical of the larger corporations or would you say it is not typical?

Mr. REICHARD. I believe that it may be typical, because I have encountered people in the industry who are also members of large companies and, of course, our company is also a subcontractor, although it is not small business; we do perform under subcontracts, and we find much the same procedure in their dealings with us under prime contracts.

Senator LONG. When you take your patent; do you take them in the name of the corporation or is that permitted?

Mr. REICHARD. Our patent applications are in the name of the individual inventor, our employee or employees.

Senator LONG. And then?

Mr. REICHARD. Then they are assigned to the company, to the corporation by virtue of a patent agreement which each employee signs upon his being hired.

Senator LONG. Does that arrangement result from the fact that under the law a corporation cannot apply for a patent?

Mr. REICHARD. Could I ask Mr. Brown to speak on that? He can answer much better than I.

Mr. BROWN. Sir, under the laws, so far as acquiring patents is concerned in this country, the application must be filed in the inventor's name. There are other countries that differ from that practice. In England, for example——

Senator LONG. Can the inventor be a corporation?

Mr. BROWN. No, sir; it must be an individual.

Senator LONG. That is the point I had in mind.

It is for that reason that you require an agreement with those who work in your laboratories, I take it, that they will apply for a patent on what they find and assign it to you?

Mr. BROWN. Yes, sir. We must do this, for one thing, to satisfy our obligations to, for example, the Atomic Energy Commission which insists upon a chain of title all the way through.

Senator LONG. Yes.

If Government research and development contracts did not give you patent rights, would you have taken Government work?

Mr. REICHARD. Yes indeed.

Senator LONG. I was going to ask if not, what would have been the alternative? The alternative, I presume, would have been to get out of business for your corporation?

Mr. REICHARD. Exactly.

Senator LONG. Do you feel that you would be in a position to demand a higher price if the contract did not give you exclusive patent rights for commercial application of what you developed?

Mr. REICHARD. I think, Senator, that would depend upon the individual case under consideration.

It would be difficult to state that that would be our policy because I do not believe it really is.

Senator LONG. Can you tell me what percentage of your contracts with the Government are on a cost-plus-fixed-fee basis?

Mr. REICHARD. Currently approximately 85 percent.

Senator LONG. Now, does that mean that the other 15 percent are negotiated?

Mr. REICHARD. The other 15 percent are in the majority negotiated fixed-price or fixed-price redeterminable contracts. There may be very few individual procurements which are as the result of advertised competitive bids.

Senator LONG. Now, from a dollar point of view would those figures, 85 percent and 15 percent be the same or would it be different?

Mr. REICHARD. That is the basis that I was using, Senator. Numerically it is just about the same.

Senator LONG. Yes.

With regard to these fixed-fee contracts, do you believe that placing them out on bid might cause them to bring the Government a lower price or a higher price?

Mr. REICHARD. You used the term "fixed fee." By this, do you mean the cost-plus-fixed-fee?

Senator LONG. Cost-plus-fixed-fee contracts; yes.

Mr. REICHARD. With very rare exceptions, almost all of the business which we are doing has been as a result of at least a design competition, although they are negotiated contracts, and in our particular field of endeavor, the competition is quite keen with respect to technical ability, know-how, good management principles, and so forth.

The expression "negotiation" is quite true, there are sometimes some very exciting negotiations which go on, but you do not even reach the point of negotiation until you have gotten on top of that heap, so to speak, competitively from a design standpoint in most of the programs we are undertaking.

Senator LONG. What are the risks that you incur on your cost-plus-fixed-fee contracts?

Mr. REICHARD. The risk of having underestimated the estimated costs and the possibility then of having to take so-called over-runs without any fee, the fee remaining fixed.

Senator LONG. Have you had that happen to you on many occasions?

Mr. REICHARD. We do have it happen to us. I can't indicate whether many is a good expression for it or not. All I know is that when it does occur to us we all feel pretty badly about it because it maladjusts the procurement agency's budget and it reduces our profits.

Senator LONG. Can you tell us the benefits that your company gets from research and development contracts?

Mr. REICHARD. I believe that the chief benefit that we see in undertaking a R. & D. contract is the hope that our ability in the particular development undertaken will put us in a preferential position for production. It is a hope rather than assurance because we have no way of being assured, and, in fact, the present laws don't permit us assurance that we will be the only producer of an item that we develop.

Senator LONG. It was my impression—and this is based on your earlier testmony—that experience and know-how, much of which you have achieved through these research and development contracts, is among your principal assets, if not the principal one.

Mr. REICHARD. You have not drawn a completely incorrect conclusion from what I remarked. Certainly the effort which we have been in, the specialized line of product with which we deal, and the fact that almost our only consumer is the U.S. Government, indeed

all of these factors have placed us in a position of being pretty good at this product line we are in.

Senator LONG. Wouldn't that be a good example of benefits the company can get from research and development contracts?

Mr. REICHARD. Yes, it is.

Senator LONG. Have you found that there were many cases where you failed to secure a production contract for an item which you had developed on a research and development contract?

Mr. REICHARD. Yes, there are several instances. One comes to my mind immediately, and that was in connection with the development of a flamethrower for the Army Chemical Corps, in which here again we had employed a rocket-engine type of principle in the nozzle of the flamethrower, and which we were unsuccessful in bidding competitively on the production.

Senator LONG. Could you multiply this example or is that a special case?

Mr. REICHARD. I am trying to recall another one immediately. There aren't very many. Because the work that we are in advances so rapidly, often military requirements change and once a product is developed and on the shelf, its production is extremely limited, or perhaps not even continued until an emergency would require it.

Senator LONG. Well, would you say, Mr. Reichard, that as the developer of an item you are in a better position to get a contract if it is placed on order?

Mr. REICHARD. That is our hope.

Senator LONG. Your hope? You ought to be able to testify for certainty on that.

Mr. REICHARD. As I said before, we get no assurance that would be the logical outcome. You may be certain, however, that we work very assiduously to prove ourselves most capable of entering the production of a development we have undertaken, and on that basis we do our very best to retain that sort of a job.

Senator LONG. It would seem to me that if you develop the product you come nearer to knowing the costs and profit possibilities of that product than some fellow starting in fresh, who doesn't know all the problems involved in producing it.

Mr. REICHARD. That is true. However, unhappily, it can occur that the fellow who doesn't know all the problems can offer a lower price and as a consequence get the job, where all the factors may not be thoroughly considered such as know-how.

Senator LONG. What incentives do you have to reward the actual inventor of a product?

Mr. REICHARD. If you please, sir, I would like to ask Mr. Brown to speak to that. He is quite familiar with our patent-award plan. Mr. Brown.

Mr. BROWN. Sir, we have a patent-award plan of which we are more than a little bit proud. We think it is probably one of the most generous, certainly in our industry and perhaps in all industries. The plan is designed to stimulate inventive thinking. It is set up to give the inventor of a patented invention, because of the difficulty in figuring out where an unpatented idea ends and where another begins, participation in any profits we receive by way of licenses and

royalties, and this naturally would limit it pretty much to commercial products.

We hope some day to have a commercial line of products. We think it is important that we do that.

To give you some specific numbers, I think it figures out to around 20 percent of the first $10,000 of royalty revenue that we might receive goes to the inventor and beyond that I am not too certain, but I believe it levels off to about 5 percent from then on.

Senator LONG. Would this type of arrangement stimulate the inventor more, in your opinion, than section 306 of the NASA Act?

Mr. BROWN. Yes, sir.

Senator LONG. Do you think you could compare the two and explain why you think you feel that way?

Mr. BROWN. Yes, I think I can. Our award plan is a pretty automatic sort of thing, I might point out. I left out one important thing, which is we pay a bonus of $25 on filing and $75 on issuance. So no matter what happens the fellow gets $100.

The NASA Act, of course, doesn't provide that. There is no real stimulus to get a disclosure into NASA.

There is also the distance factor, which I think must not be overlooked. Our plan is a somewhat more personal thing. The people are right there. They know the procedure. They know the routine. They know the people they are dealing with. They are helping their company. They are helping themselves.

I think it is fair to say a fellow who is of an inventive disposition receives an award certainly above and beyond the awards that are obtained through the patent-award plan. I can think of a number of people who are very prolific inventors who now hold responsible positions in the company. This is something, of course, that the Space Act cannot do.

There is also this aspect. Most inventors tend to be dreamers, and $100,000 is chickenfeed when you are dreaming. If you reflect a moment on the Space Act, if my memory serves me correctly, any award in excess of $100,000 requires the approval of the Congress. I don't say that is impossible, but it certainly is a little more difficult.

There are no limits in our plan. I will add very hastily I doubt very much that any inventor that I know is likely to earn $100,000 out of our plan. I doubt that Aerojet itself is likely to earn that amount in royalties.

These are sort of rambling thoughts, but I really think our own personal sort of plan is more conductive toward invention.

Senator LONG. You do not feel that recognition by the Government, the national publicity that is attendant to the individual, the honor, is more than the fixed award that your company gives inventors?

Mr. BROWN. No, sir; I did not say that. I would like to make this point; that at the present time I don't know of any awards that have been granted under section 306. I think if this were done, it might be a significant factor, and I would think that it would very well be, but I think the chances of any one individual obtaining a benefit through the Space Act are somewhat less than his opportunity to obtain a benefit through a plan such as ours.

Senator LONG. Now, Mr. Reichard has said in his prepared statement that Government R. & D. contracts are high-risk contracts. Why would you say that they are high-risk contracts?

Mr. REICHARD. I was thinking first in terms of the fact that holding the R. & D. contract gives no assurance of future production. The earnings permitted by the Government on R. & D. contracts are necessarily quite low, and you can appreciate, I believe, the type of facilities and the type of technical manpower that we put to work on a given R. & D. contract might earn an appreciably higher rate of profit if their efforts were devoted in another specific production area. This is, generally speaking, what I was referring to.

Senator LONG. Your company's phenomenal growth would indicate the opposite, wouldn't it?

Mr. REICHARD. The phenomenal growth of our company is largely influenced by the interest our company has had in the defense efforts, and this in itself, I would say, is not, strictly speaking, the method by which most of the prominent established companies in this country were formed. It is not really on that basis.

Senator LONG. Didn't you describe your fixed-fee contracts as being roughly 7 percent of the cost?

Mr. REICHARD. That is the earning rate. That is the maximum earning rate which we normally anticipate on cost-plus-fixed-fee contracts. Statutory provisions go up as high as 15 percent. The maximum on any one contract that we have received as a fixed fee has been 10 percent of estimated costs, and by far the average that we are receiving across the board is 6 percent.

Senator LONG. Six percent of cost?

Mr. REICHARD. Six percent of estimated cost at the outset.

Senator LONG. Now, that would work out, I take it, though, to be more than 6 percent. It would work out to about 6½ percent if you stated it on a cost-plus basis. That would be about 6½ percent over cost. Six percent of cost ought to be 6½ percent over cost. You see what I mean?

Mr. REICHARD. I don't quite understand your question, Senator.

Senator LONG. Suppose the Government is paying you $100 and 94 percent of that is cost, then 6 percent works out to be about 6½ percent of 94.

Mr. REICHARD. Oh, I beg your pardon, sir. The 6½ percent to which you referred does not exist on that particular cost-plus-fixed-fee contract. If the estimated costs were $94, the 6 percent would be taken as a percentage of the $94, and that would be slightly under $100 total price.

Senator LONG. Yes. I see.

What would be your guess as far as just the industrial average profits compared to volume of sales?

Mr. REICHARD. Our estimated earnings this past year—our fiscal year ended November 30, 1959—will be approximately 5 percent of our total sales before taxes.

Senator LONG. And how would that compare with the profits on net worth?

Mr. REICHARD. I haven't worked out the computation, sir. I don't know offhand.

Senator LONG. Would you provide that for the record?

Mr. REICHARD. Yes.[6]

Mr. GORDON. I quote from page three of your statement:

Another important reason is the fact that we are faced with the problem of preventing others from rediscovering an invention made by us in the performance of classified work and obtaining a pattern which would hinder or impair our activities under United States Government contracts or induce the Government to grant production contracts to the later discoverer by reason of a patent obtained by him.

I think this is a very interesting statement. Aren't you really saying here that you want to get a patent as rapidly as possible so you can do to a competitor what you don't want him to do to you; namely, to get a competitive advantage?

Mr. BROWN. No, sir.

Mr. GORDON. What is the precise meaning of that statement, please?

Mr. BROWN. Under current ASPR regulations on the point I am now discussing—they have been the same for at least as long as I can remember—the Government requires a nonexclusive royalty license. In the standard patent-right clause there is an obligation imposed upon the contractor to file an application for inventions made or to see that the Government has the information needed to do so. There is a lot of information at times. Some of it of limited interest and some of it of substantial interest.

I would like to give this example of the problem. The corn farmer in Iowa is struck by a flash of genius and invents a brand new rocket motor. We invented the same thing, let's say, a year ago. Our invention is licensed to the Government. My hypothetical farmer in Iowa owes no obligation to the Government. His invention is strictly proprietary to him. He can compel—well, I am getting ahead of my story.

In our case we could under normal circumstances, if there were no commercial potential and we wished to do so, publish an article describing the invention, and after a year this would be in effect a statutory bar against anyone acquiring a monopoly. It would in effect put the inventions within the public domain.

If you did not file and the invention were kept secret for security reasons, and another person independently, on his own, reinvented the same thing, he could nonetheless acquire a monopoly as against both Aerojet, for example, and the Government. Do you follow me?

Mr. GORDON. I follow you.

Mr. BROWN. So in a sense we are protecting both our right to manufacture and the Government's right to manufacture at one and the same time. That is the thing we were alluding to there.

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[6] Information subsequently supplied by Mr. Reichard follows:

"SUPPLEMENTARY INFORMATION FOR MONOPOLY SUBCOMMITTEE, DEC. 9, 1959

"As requested by the chairman during testimony on Dec. 8, the following additional fiscal information on Aerojet-General Corp. is offered.

"During the testimony Aerojet's net worth was estimated at approximately $58 million. Actually, although the books of the company have not been audited for the end of our fiscal year as at Nov. 30, 1959, the estimated net worth of the company, including borrowings of approximately $8 million, is $60,800,000. It is also estimated that the net earnings of the company, after taxes, as at Nov. 30, 1959, will be $8,100,000. Upon the basis of these estimates, the earnings of Aerojet-General Corp. for its fiscal year 1959 would be approximately 13.3 percent, after taxes, of the company's net worth.

"We wish to emphasize that through the years of our company's growth, thorough scrutiny by the Renegotiation Board each year has revealed that the earnings of Aerojet-General have not been excessive. It is also desired to point out that in 1957 the company obtained $7,300,000 in new capital and in 1959 obtained an additional $12,400,000 of new capital to assist in our program of facilities expansion needed to conduct defense programs."

Mr. GORDON. But if you didn't take title, the Government would take title.

Mr. BROWN. Not necessarily.

Mr. GORDON. There seems to be a regulation or at least the practice. Mr. Falvey [7] will say that tomorrow in his prepared statement, that the Government will take title if the contractor decides not to do so and if it is in the public interest to take title.

Mr. BROWN. Yes, but this does not establish the priority date. You see, as a matter of procedure what happens is that at two steps along the line somebody says it is either patenable or not patentable. That is the first determination. It is either an invention or it is not an invention. Assuming you decide it is, then you decide whether or not you are going to file for it. In doing that you normally would consider what advantage accrues to me if I wish to file this application. If there is no advantage at all, there is no point in filing it. Do you follow me?

Now, then at this same time that we elect not to file, at this same time then the determination is again made by the Government as to whether or not the invention is patentable, do you see, and even if it is patentable, there the Government itself may decide that it does not warrent the protection—its significance and potential does not warrant a patent protection.

If I may speak of my personal experience, I have been at this for some time now, but my batting average on spotting patentable inventions is not nearly as good as I would hope for it to be. You just simply can't do this.

Mr. GORDON. This is done then for defensive reasons.

Mr. BROWN. Yes the point that you referred to in the prepared testimony, yes, was referring to defensive patent protection.

Mr. GORDON. But this is the crucial part of the sentence right here:

* * * induce the Government to grant production contracts to the later discoverer by reason of a patent obtained by him.

Mr. BROWN. Yes, we are referring there to a private monopoly, a patent owned by an individual, not subject to a license to the Government.

Bear in mind that where Aerojet-General makes an invention under an R. & D. contract the Government and any Government prime contractor can manufacture that invention under the patent without concern. The Government is licensed, but where my hypothetical individual makes an invention with no relation whatsoever to the Government, that is a personal monopoly to him which may be asserted against the Government. It can only be asserted against the Government because of the special provisions in our laws which provide that the contractor cannot be enjoined.

Mr. GORDON. Do you engage mostly in defense work?

Mr. BROWN. Yes, sir.

Mr. GORDON. Is it very likely that a private individual would develop something that way?

Mr. BROWN. Oh, yes, very definitely it is.

Senator LONG. This thought occurs to me. If it isn't provided in our patent laws shouldn't we then amend those laws to make available

[7] James P. Falvey, Deputy Assistant Secretary of Defense (Supply and Logistics). See p. 279 for statement.

to the Government any patented invention for a reasonable fee that we need for national defense?

Mr. BROWN. Sir, there is such a provision. The Government may use any patented invention subject to payment of compensation. Now, the payment of compensation is, of course, an additional cost. It is a cost as between a contractor who owns the patent and one who does not. The Government is probably better advised to go to the owner of the patent because then perhaps he need not pay that additional consideration. That is the only point I am making. I say there is some inducement, but I will again point out the Government need not respect patent rights.

Mr. GORDON. If Government policy were to take title, then there would be no problem here?

Mr. BROWN. No, that would not be an answer to the problem.

Mr. GORDON. If you develop something at Government expense and the Government takes title, what is the problem?

Mr. BROWN. That would not be the answer to the very special problem I am alluding to just now that arises primarily because of security. Security conceals an invention, keeps it from coming into the public domain, and as you know, when you reach a given time and an invention is ripe to be made, very often more than one person makes it. The Government may lose its ownership even if it has title if it does not go ahead and file a patent application.

Now, I submit from my own personal analysis of the thing, when you take something as complex as a Titan rocket, for example, I am quite certain that there are many little wrinkles in there that if you were to go after them individually you could acquire a patent but if you didn't you might just find that some little wrinkle came home to roost at some day in the future. You try to guard against this kind of thing. This is one way you can do it.

Senator LONG. Suppose you pay a man to invent one of these items to which you have referred. He invents it; files for a patent; and then he assigns it to you. When the Government has paid you in turn to have that done, you could just as easily assign that to the Government. As far as putting it on record and giving notice, the notice is there whether the Government is holding the patent or whether you hold it.

Mr. BROWN. Where that is all that is involved I agree with that statement.

Senator LONG. Now, let's get to your second point. You would not want a private inventor who does not have a Government contract to go out and file the same patent because he would then be at a cost advantage over you or anybody he licensed would be at a cost advantage over you if they were trying to produce the same product.

Mr. BROWN. Traditionally the first inventor is the one entitled to the rights. He may dispose of them as he sees fit. He can bargain them away, give them away, or sit on them and let them rot away.

Senator LONG. But the point is that assuming that you were compelled to transfer a patent over to the Government on the basis of what you achieved on a Government research and development contract, there would be an incentive to you to file as soon as you could because if you didn't do that and another private inventor developed it, he would have a cost advantage in producing the same item as against you, would he not?

Mr. BROWN. Absolutely. I submit, however, this is detrimental to both our interest and that of the Government.

Senator LONG. Why is it detrimental to the Government's interest?

Mr. BROWN. Because the Government could itself prior to the acquisition of the patent by a private inventor, practice the invention either through Aerojet, for example, or through any other company. Now, its choice is restricted to one source unless it is willing to pay a premium, and that one source may not be able to produce at a low cost or may not be able to produce a quality product.

Senator LONG. But you just got through saying it would be to your advantage to protect both your interest and the Government's interest to begin with?

Mr. BROWN. Yes, sir.

Senator LONG. Even if the Government held the patent, even if you were required to sign the patent rights to the Government.

Mr. BROWN. It is important to avoid the adverse monopoly for a later re-discovered invention. I think that is true no matter whose interests are involved. That is the point I am making.

Mr. GORDON. Suppose an individual inventor comes across some classified material, could he patent it?

Mr. BROWN. No, sir; our laws provide that only the inventor may file an application. If you were to appropriate an invention from documents of that character, it would be a fraud upon the Patent Office and presumably the patent could be declared invalid for that reason.

Mr. GORDON. It could be declared invalid?

Mr. BROWN. Yes, sir. I am not suggesting that anybody is making a practice of appropriating inventions out of classified materials.

Mr. GORDON. How much of your business is research and development and what percentage of your business is production?

Mr. REICHARD. Approximately 85 percent of our business currently is research and development and about 15 percent is production.

Mr. GORDON. Approximately how much of your own money is spent on research and development? Or does the Government pay for it completely?

Mr. REICHARD. This varies from year to year, depending upon which programs our corporate management feels are worthy of this type of investment. In some years it has been as high as half a million to a million dollars.

Mr. GORDON. Do you know what percentage that would be?

Mr. REICHARD. In terms of our total volume of business?

Mr. GORDON. Yes; in terms of your total volume of R. & D., yes. Roughly.

Mr. REICHARD. Something like 1 percent.

Mr. GORDON. That is a pretty small percentage, is it not?

Mr. REICHARD. A very small percentage; yes.

Mr. GORDON. What do you mean by—and I quote from your statement

> that years of experience and know-how, which is the lifeblood of corporate existence, becomes freely available to competitors in exchange for a maximum 7-percent fee.

Is this a cost-plus-fixed-fee or royalty?

Mr. REICHARD. No; we are referring to the cost-plus-fixed-fee.

Mr. GORDON. Now, you close your statement by saying that, and I quote:

Destroy the ability to acquire a proprietary position in any field and you will find higher mortality rates in all.

By proprietary rights do you mean monopoly rights?

Mr. REICHARD. Not necessarily. As I referred earlier to a proprietary position, I feel that it includes all the element of good management, facilities, the resources of any given organization to produce its services or products some of which are not necessarily protected at all by present law.

Mr. GORDON. Do you feel that a monoply position in a particular industry will deter investment in that industry? To put it another way, do you think that if the company doesn't have a monopoly in an industry, it isn't going to invest?

Mr. REICHARD. No; I don't think so.

Mr. GORDON. Let's now be more specific and examine one particular contract between your company and the U.S. Government. The contract is that for the rocket motor of the Titan missile and the concomitant maintenance contract. How much money is involved?

Mr. REICHARD. Just a moment. The current total funding for the Titan engine development approximately $270 million. A concomitant contract which provides for certain manufacture and delivery of that engine, together with certain ground-support equiment and technical manuals, reports and maintenance planning, is currently funded at approximately $75 million.

Mr. GORDON. That is for the prototype, or is that the volume production?

Mr. REICHARD. There is no such thing as volume production on it. This is the manufacturing of the first developed engine.

Mr. GORDON. Is this on an R. & D. contract, or is this part of your supply contract?

Mr. REICHARD. The first contract which I mentioned, the development contract, is strictly an R. & D. contract. The second contract is also a cost-plus-fixed-fee contract, with the usual provisions for R. & D. type contracts contained within it.

Mr. GORDON. This is partly R. & D. and partly supply?

Mr. REICHARD. Correct.

Mr. GORDON. Now, what are you supposed to develop? Precisely what is the Government supposed to be getting as a result of its contracts with you for this item?

Mr. REICHARD. It is supposed to be getting the power plant which will provide the correct performance for the Titan missile.

Mr. GORDON. How about all the data that goes with it?

Mr. REICHARD. All the data that goes with it; indeed, yes.

Mr. GORDON. Have you already delivered up to the Government all the scientific and technical knowledge developed by you with respect to this particular machine?

Mr. REICHARD. We are delivering it on a current basis as rapidly as it is produced. At the end of any given phase in development, when a design has completed all of its development and qualification testing and is in fact declared to be an operational design, the final material applicable to that operational design will be delivered.

Mr. GORDON. Will the data be adequate so that another competent company armed with this data could produce the rocket motor?

Mr. REICHARD. That is what the Air Force says.

Mr. GORDON. How about maintenance? Will there be adequate data so any other company could repair and maintain these motors? Could a small company produce any of its parts?

Mr. REICHARD. To the extent the Government has specified that there should be maintenance outside the factory, this is correct. However, the device is an extremely complicated beast and requires highly specialized knowledge and techniques on the part of the individuals working with it, and my understanding of the contract is such that the Air Force has an established logistic program which does involve overhaul and maintenance depots and so forth. We naturally have to comply with those requirements to the extent that we are contracted to do so.

Mr. GORDON. I was given the impression by certain people who are in the Defense Department that this is one of the few contracts which does not require delivery to the Government of data and scientific knowledge. Did you check on that?

Mr. REICHARD. I think I know what you are referring to. I believe that this stems from what was originally a mistake in the compiling of the contractual document itself. The procurement people and our company contracted in the negotiations to deliver data in accordance with certain standard data clauses. In the final assembly of one of the contractual documents, the page containing the data clause was not assembled with the document, but as far as we are concerned and as far as the Air Force is concerned, and indeed, by a general amendment to correct that mistake, the data clause is indeed included in those contracts. So the data will indeed be delivered. In fact, it has been delivered from the outset of the contract in accordance with that clause.

Mr. GORDON. You say this data clause was left out through error?

Mr. REICHARD. It was a clerical error and certainly as such, therefore no competent person would suggest that it wasn't a part of the contract.

Mr. GORDON. Since the Government has paid for the development of this item, the data involved would no doubt be the property of the United States, would it not?

Mr. REICHARD. Absolutely.

Mr. GORDON. To do with as it wishes?

Mr. REICHARD. Yes, indeed.

Mr. GORDON. That includes foreign rights, too, doesn't it?

Mr. REICHARD. I am not certain that the data clause included in those contracts includes foreign rights. As far as I know they are in accordance with the standard ASPR clauses that were current at the time and do not include foreign rights.

Just a moment. We may have a different answer.

No; this one has no restrictions on it, Mr. Gordon.

Mr. GORDON. Pardon?

Mr. REICHARD. The data clause in the Titan-engine contract has no distinction with regard to foreign or otherwise. I will quote.

Mr. GORDON. Could you supply that, please?

Mr. REICHARD. Indeed, yes. I will turn it in, but I will quote that particular section:

The Government may duplicate, use, and disclose in any manner and for any purpose whatsoever, and have others so do, all subject data delivered under this contract. [8]

Mr. GORDON. How about patent rights on the rocket motor itself or on its parts? Who gets that?

Mr. REICHARD. That is the standard ASPR provision which the Air Force calls PARO [8a] No. 9–4.

Mr. GORDON. Your company gets that?

Mr. REICHARD. Yes. I can turn this in to you. It is ASPR clause 9–107.2(b).[8b]

Mr. GORDON. Suppose the U.S. Government decides it wishes to have manufactured in the United States a quantity of rocket engines for delivery to our allies, how does this work out? Please outline the exact details of such a transaction?

Mr. BROWN. As far as I am concerned, if the U.S. Government itself desires to produce those missiles, for whatever purpose it may wish, it has the right to do so under the terms of this contract.

Mr. GORDON. Now, suppose the U.S. Government decides that it is in its interest to allow, say, a French manufacturer to produce the rocket engines for its own Government. How does this work out?

Mr. BROWN. Under the terms of the patent-rights clause if patent rights are involved, my interpretation to the clause is the French Government would require a license.

Mr. GORDON. And pay the Aerojet Co. royalties?

Mr. BROWN. Yes, sir. I might also add this additional factor. I don't think that any knowledgable company or government would undertake to manufacture a system like Titan or a number of others that I might mention without technical assistance from the original manufacturer.

Mr. GORDON. They would have to pay for the technical assistance in addition to the royalty; would they not?

Mr. BROWN. I think you would find the royalty would be relatively modest. The technical assistance, of course, is the essential element.

Mr. ANSBERRY. I understand your testimony to be that only three of of your several hundred patent applications are believed to have commercial application; that only three of your several hundred patent applications are believed to have commercial application?

Mr. BROWN. That is correct.

Mr. ANSBERRY. How many of your unpatented developments under Government R. & D. would you say have commercial application although not patented?

Mr. REICHARD. It is difficult, sir, to really predict these things. I should perhaps correct my immediate prior response. We have found that out of all of our patent applications only three currently have commercial application. We are hopeful that others of our patent applications will someday find commercial values, but because of the very nature of our business, being as specialized as it is, we really have only one customer, and that is the Government, and we do not foresee in any particular instance an immediate use com-

[8] See exhibit III(B), p. 97.
[8a] Patent and Royalty Office.
[8b] See exhibit III(C), p. 101.

mercially of these four-hundred-odd inventions that we have made since our company started.

Mr. ANSBERRY. What about this nitromethane explosive which is considered for use in the petroleum industry?

Mr. REICHARD. That was a hope that we once had, and I think that it has proved itself not to be as happily commercial as we wanted it to be.

Mr. Brown informs me it now has revived interest, and nobody told me it had. Apparently we have to improve it considerably to make it work, Mr. Brown informs me, and that would mean necessarily we would have to do that with our own money, so we will have to decide how much to risk.

Mr. ANSBERRY. I see.

Senator LONG. Let me ask this question. Now, assuming that some of these patents do become valuable, that one of these days they will have a very substantial business use. Do I understand that you would have a monopoly or proprietary position with regard to that item for civilian use?

Mr. REICHARD. Yes, sir.

Senator LONG. Suppose you came up with something that would drive a better automobile, for example, or propel a better aircraft. That would be exclusively yours for private sale even though the discovery had been financed by the taxpayers?

Mr. REICHARD. Yes, sir.

Senator LONG. Now, if someone wanted to manufacture this in competition with you, he would have to pay you a fee or become your licensee, would he not, and pay you the amount you would be willing to agree upon for the use of that patent?

Mr. REICHARD. For commercial use; yes, sir.

Senator LONG. That would in turn increase his cost of producing and selling that same commodity?

Mr. REICHARD. Yes, sir.

Senator LONG. And you would be able to secure a higher price because you have a monopoly position than you would if you were faced with competitors; isn't that so?

Mr. REICHARD. Yes, sir.

Senator LONG. That is the whole idea of patents. Considering the fact that the taxpayer is paying you to develop this thing in the first instance, and your business has been very successful in doing it, why should he pay you a second time to buy your product for commercial use?

Mr. REICHARD. I haven't really looked at it from that standpoint and considered it to be a particularly bad thing. The sort of earnings which the Government pays us to do the work we do and the services which we perform considers that ultimate possibility, and we feel in negotiating a contract with such a patent clause that part of the consideration and therefore part of the payment for our services is that future possibility such as you have described.

Senator LONG. Well, here is the thought that occurs to me. I am sitting here as a representative of the taxpayers, and there is also some interest on the part of some industry in my State, because we are trying to get some business along with others. Now, you appear to be a very nice fellow, the kind of fellow perhaps I could do business

with. But suppose you are a hard-hearted Hannah and I make a contract with you for military application of some research, and then about 10 years from now I find that you are going to make me pay through the nose to get back the same thing I paid you for to begin with. Why should I sign that type of contract? Why shouldn't I bargain for a contract where if I pay you $5 million or $15 million or $20 million, and you make a nice profit out of it, that what you developed is something I won't have to pay for twice? Once I have paid for it, it is mine.

Mr. REICHARD. As I understand it, Senator, it is possible right now for the Government buyer, if he wishes, to so negotiate to have me undertake a contract as a contractor in which I completely relinquish any rights whatsoever to any inventions which I might make and give them to the Government.

Senator LONG. The Government can ask again for that.

Mr. REICHARD. Yes, they can.

Senator LONG. Why shouldn't they?

Mr. REICHARD. I guess they do sometimes. We try to avoid it if we can because the Government on the one hand doesn't offer a very high profit with the other hand when it bargains that way, that is all.

Senator LONG. You testified just about half hour ago that you would certainly take the contract on those terms and so far as you know you probably wouldn't even ask for any more money.

Mr. REICHARD. I didn't quite say it that way, but I did say we would certainly take a contract on those terms if it were 100-percent Government practice to just see to it that R. & D. contracts never gave any rights to the contractor or permitted the contractor to retain the rights that he starts out with. If that were part of the bargain, we would go along with it, and the chances are we would probably do our best to stay in the R. & D. business. We wouldn't like it though.

Senator LONG. The odds are if you had been doing business that way you wouldn't be here complaining that your company had only multiplied 40,000 times in value. You would be fairly satisfied you had made a fairly good deal.

Mr. REICHARD. We think it is an all right deal. It is rather modest, but we like it.

Mr. ANSBERRY. One further question. We discussed here this morning the British Government patent policy in connection with their R. & D. where they take a proportion of the fruits of the invention and retain either a percentage of the royalty which you might receive from another manufacturer or charge you direct royalty on your own manufacture. What do you think of such a system in this country?

Mr. REICHARD. Mr. Brown is our patent counsel. I haven't considered that problem. He suggests that it would be all right.

Mr. GORDON. In other words, we aren't getting as much as we could have gotten out of you in the first place.

Senator LONG. I was just noticing here in a statement made by Congessman Harris B. McDowell, Jr., of Delaware, that the Viscount developed under Government contract has returned enough to the British treasury to cover their original cost and yield a profit. They actually made money on it. (See p. 373 for Mr. McDowell's statement.)

Let me thank you for your testimony, Mr. Reichard, and congratulate you on the selection of an able counsel. Apparently he has a few more years to go at this business. Apparently he will last awhile. He seems to be getting along very well.

Thank you very much.

We will include in the record at this point, the following documents submitted by Mr. Reichard, and referred to during the course of his testimony:

(A) List of Aerojet-General patent applications.

(B) Data clause and patent clause of the Titan engine contract which were requested for the record.

(C) ASPR (Armed Services Procurement Regulation) Clause 9–107.2(b), from which the contract patent clause was derived.

Following these documents we will insert the prepared statement of Mr. Reichard (p. 104).

(Documents submitted by Mr. Reichard follow:)

EXHIBIT III (A)

I. SUMMARY OF AEROJET-GENERAL CORPORATION ISSUED PATENTS

SOLID PROPELLANTS

51	Propellant Composition
90	Propellant Composition
91	Solid Propellant Charge for Rocket Motors
124	Rocket Propellant Charge and Liner

CHEMICAL COMPOSITION AND PROCESSES

296	2,2-Dinitro-1,3-Propanediol
143	Dinitrodiols and their Alkali and Alkaline Earth Metal Salts
151	Tetranitrodiols
180	Trans-vinylene Diisocyanate
206C	a,a,w,w-Tetrahalo-a,w-Dinitroalkanes
232A–C	Amino Esters
232C–C	N-(Carboxyalkyl)Dinitro Lactams

LIQUID PROPELLANTS

1	Reaction Motor Operable by Liquid Propellants
1D	Reaction Motor Operable by Liquid Propellants
1D–3	Rocket Propulsion Method
1D–4	Rocket Propulsion Method
43	Operation of Jet Propulsion Motors with Nitroparaffin
44	Fuel Combustion
54	Fuel for High Impulse Jet Motors
96	Nitroalkanes with Chromium Acetonylacetonate
97	Fuel Containing Nitromethane and Nitroethane
110–C	Method of Jet Propulsion by Spontaneous Combustion of Furfural

MISCELLANEOUS

79	Lubricant
80	Protective Coatings
113	Propellant Composition Comprising Nitroparaffin Gel
113–D	Process for Gelling Liquid Nitroparaffins
163	Cation Exchange Apparatus
240	Method of Removing Heavy Metal Ions from White Fuming Nitric Acid
321	Method of Programing the Precession of Gyroscope
355	Method of Preparing Boron Trialkyl

I. SUMMARY OF AEROJET-GENERAL CORPORATION ISSUED PATENTS—Continued

ROCKET MOTORS AND COMPONENTS

5	Jet Propulsion Motor
6	Motor
8	Motor
24	Reaction Motor
26	System for Jet Propulsion
27	Rocket Motor with Solid Propellant and Propellant Charge
30	Exhaust Nozzle for Rocket Motors
45–C	Ignitor
46	Reaction Motor with Fluid Cooling Means
57	Jet Thrust Motor
59	Pressure Release
62	Thermal Jet and Rocket Motor Propulsion System
68	Rotary Reaction Motor
69	Jet Motor Operable by Monopropellant and Method
71	Liquid Propellant Injection System for Jet Motors
71–D	Jet Motor with Cooling System
73	Sequence Firing of Jet Motors
75	Two-Piece Jet Thrust Motor
76	Jet Propulsion Device
78	Reaction Propelled Device for Operation Through Water
82	Jet Propulsion Device for Operation Through Fluid Medium
83	Motor Mounting
88	Reaction Motor with Propellant Charge Mounted in It
92	Combustion Chamber for Gas Generation Provided with Cooling Means
103	Means for Igniting Propellant in Rocket Motors
117	Apparatus for Jet Propulsion through Water by Combustion of Carburated Fuel
130	Device for Jet Propulsion through Water
131	Initiation of Propellant Decomposition
136	Apparatus for Mounting Solid Propellant in a Rocket Motor
153	Fuel Injector Pump
156	Gasoline Air-Hydropulse
158	Propellant Supply System for Jet Propulsion Motor
372	Pressure Absorbing Device

TESTING AND INSTRUMENTATION

107	Pressure Operated Resistor
115	Pressure Pickup
123	Pressure Responsive Device
128	Pressure Measuring Device
145	Pressure Pickup
148	Metallic Film Electrical Pickup
174	Gelation Timing Device
334	Resonant Mounting

CONTROL DEVICES

63	Electrical Control System
77	Valve
81	Valve
133	Diaphragm Safety Device
171	Valve
194	Autopilot Steering System
222	Switch
297	Method of Programing the Precession of Gyrocope
345	Fluid Pressure Operated Dispensing Device
397	Differential Fluid Pressure Switch Device
436	Pressure Responsive Actuator

IR AND OPTICAL

362	Scanning Device
452	Optical Rectifier

I. SUMMARY OF AEROJET-GENERAL CORPORATION ISSUED PATENTS—Continued

OIL WELL

239	Fracturing Formations in Wells
246B	Oil Well Tool

MISCELLANEOUS

13	System of Propulsion
48	Filling Nozzle Valve
112	Nozzle Valve
114	Detonation Trap for Liquid Explosives Using Frangible Coupling
159	Fluid Delivery Device
211	Valve
216	Coupling Device
235	Nozzle
239	Fracturing Formations in Wells
253–A	Swimmer Propulsion
253–C	Vessel
272	Turbo-Pump
356	Scanning Device
365	Anti-Chatter Switch
366	Compressed Air Reciprocatory Vibrator
431	Method of Making Metal Joint

DESIGN PATENTS

15	Design for a Jet Motor
16	Design for a Jet Motor Cap
17	Design for a Jet Motor Cap
18	Design for a Jet Motor Cap
20	Design for a Jet Motor Cap
34	Design for a Rocket Motor
35	Design for a Rocket Motor
36	Design for a Rocket Motor Nozzle
463	Flame Thrower Fuel Group Assembly

II. SUMMARY OF AEROJET-GENERAL CORPORATION PENDING PATENT APPLICATIONS

INFRA-RED AND OPTICAL DEVICES

427	Image Nutator
428	Image Nutator
506	Acquisition Scanner
597	Proximity Warning Systems
598	Infrared Azimuth Receiver W–12
254–C	Optical Detector

OIL WELL APPARATUS

246	Piston Type Heat Engine for Submerged Operation in Oil Well
248	Gas Envelope for Oil Well Perforators
459	Explosive Method of Fracturing Oil Wells
543	Setting Tool, Propellant Operated
544	Propellant Set Bridging Plug
571	Well Packer
572	Segmented Slips for Oil Well Packers
575	Method of Seismic Exploration
601	Junk Breaker for Use in Oil Wells
602	Spring Loaded Firing Device
603	Floating Go-Devil Firing Device
604	Firing Device for Oil Well Tools
605	Telescopic Firing Device
607	Packing Unit for Oil Well Tools
623	Oil Well Tool Pressurizing Device
657	Expanding Chamber Shaped Charge
247	Bailing Device for Wells
492	Bucket Type Jet Bailer

II. SUMMARY OF AEROJET-GENERAL CORPORATION PENDING PATENT APPLICATIONS—Continued

TESTING AND INSTRUMENTATION

187	Electrical Pressure Detecting Device
299	Gas-Liquid Detector

CONTROL DEVICES

282	Fluid Flow Modulator
303	Valve Structure to Control Liquid Fuel Rocket Motors
323	Electronic Gate Circuit
358	Malfunction Control for Liquid Fuel Rocket Motors
370	Gravimetric Flow Ratio Control Device
398	Geared Shaft Synchronizing Phasing System
408	Line Valves for Fluids
434	Hydraulic Valve
474	Method of Firing Explosive Charages Simultanesously
501	Modulation of Sound Sources
249	Shut-off Device
390	Electrical Monitoring System for Gas Pressure
424	Pressure Switch

PROPULSION MOTORS AND COMPONENTS

121	Method of Initiating Decomposition of Propellant in Rocket Motor
84	Jet Propulsion
109	Method & Apparatus for Jet Propulsion through Water
125	Inverted Hydropulse
129	Device & Method for Jet Propulsion through a Water Medium
135	Jet Propulsion Device for Operation Submerged in Water
189	Turbojet Motor
192	Safety Diaphragn
257	Heating Tube
293	Gas Generator
354	Shock Absorber
357	Thrust Chamber
361	Thrust Reverser
364	Injector
374	Gas Generator
486	Thrust Reverser
58	Jet Propulsion Apparatus
251	Power Plant for Bi-Medium Missile
342	Folding Fin
119	Hydroturbojet
120	Means for Supporting a Propellant in Rocket Motor
215	Nozzle
160	Hydroductor
488	Ignitor
569	Spark Gap Device

LIQUID PROPELLANTS

52	Jet Propulsion Motor Operation
137	Propellant Fuel
149C	High Energy Fuel Compositions
162	Oxidizer Compositions
302	Stabilization of Nitromethane
308	Monopropellant Fuel
312	Method of Accelerating Thermal Decomposition of Nitromethane

SOLID PROPELLANTS

144S	Polyurethanes
160D	Solid Propellant
168	Solid Propellants
178	Solid Propellants
210D	Resin Compositions

II. SUMMARY OF AEROJET-GENERAL CORPORATION PENDING PATENT APPLICATIONS—Continued

SOLID PROPELLANTS—continued

227B	Polyurethanes
227D	Polyurethanes
227F	Polyurethanes
237	Solid Propellants
252	Catalyst Burning Rate
271	Solid Propellants
290	Method for Reducing Burning Rate
338A	Burning Rate Catalyst
338C	Burning Rate Catalyst
338D	Burning Rate Catalyst
457B	Cross-Linked Polyurethanes
457A	Polyurethanes
85–C	Propellant Substances
90D	Smokeless Propellant Composition
90D–1	Smokeless Propellant Composition
99	Solid Propellant
104C	Solid Propellant
139	Solid Propellant
146	Propellant Liner
147	Propellant Restriction
197	Hydrofuel
198	Solid Propellant
201	Resin
213	Propellant Composition
220	Igniter
223	Hydrofuel
228	Propellant Compositions
150	High Impulse Rockets
291A	Propellant Compositions
296A	Solid Propellant
296B	Solid Propellant
338B	Burning Rate Catalysts
338F	Burning Rate Catalysts
549	Polymerization Catalysts

CHEMICAL COMPOSITIONS AND PROCESSES

Approximately 162 pending patent applications previously in the field of aliphatic nitro-chemistry.

MISCELLANEOUS

217	Shock Absorbing System
252	Fluid Mine or Depth Charge
258	Low Frequency Sound Generator
329	Gas Electrodes for Primary Cell
330	Gas Depolarized Battery
373	Composite Bearing
399	Sound Generator of High Energy Sonic Waves
421	Warhead
422	Gas Generator Ignitor Assembly
422C	Fuel Rod Ignition for Flame Thrower
422B	Fuel Nozzle Closure for Flame Thrower
422E	Multiple Ignition Device
439	Wheel Lock for Dual Wheel Caster
470	Swivel Connector (Design)
477	Warhead
480	Warhead
494	Strain Relief for Cable Connectors
499	Packing Container
513	Cathode for Batteries
522	Method of Fabricating High Strength Tubes
590	Wave Shaper for Explosives

II. SUMMARY OF AEROJET-GENERAL CORPORATION PENDING PATENT APPLICATIONS—Continued

MISCELLANEOUS—continued

548	Barrel Lift and Delivery Pack
629	Floatride Container
654	Identifying Holder for a Pencil or Similar Article (Design)
328	Dryer
340	Magnetically Operated Switch
710	High Speed Cargo Ship (Design)
711	High Speed Aircraft Carrier (Design)
712	High Speed Ship Design (Design)
718	Thermally Regenerative Battery
717	Explosive Forming Method & Apparatus
0E–1	Electronic Signaling System
306	Cement Composition
307	Cement Composition
335	Improved Diesel Fuel Oils
540	Determination of Minute Cracks

EXHIBIT III (B)

DATA CLAUSE AND PATENT CLAUSE OF THE TITAN ENGINE CONTRACT

40. *Data*—(a) The term "Subject Data" as used herein includes writings, sound recordings, pictorial reproductions, drawings or other graphical representations, and works of any similiar nature (whether or not copyrighted) which are specified to be delivered under this contract. The term does not include financial reports, costs analyses, and other information incidental to contract administration.

(b) The Contractor agrees to and does hereby grant to the Government, and to its officers, agents, and employees acting within the scope of their official duties, a royalty-fee, nonexclusive and irrevocable license throughout the world for Government purposes to publish, translate, reproduce, deliver, perform, dispose of, and to authorize others so to do, all Subject Data now or hereafter covered by copyright; provided, that with respect to the Subject Data now or hereafter covered by copyright and not originated in the performance of this contract, such license shall be only to the extent that the Contractor, its employees, or any individual or concern specially employed or assigned by the Contractor to originate and prepare such Data under this contract, now has, or prior to completion or final settlement of this contract may acquire, the right to grant such license without becoming liable to pay compensation to others solely because of such grant.

(c) The Contractor shall exert all reasonable effort to advise the Contracting Officer, at the time of delivery of the Subject Data furnished under this contract (i) of all invasions of the right of privacy contained therein and (ii) of all portions of such Data copied from work not composed or produced in the performance of this contract and not licensed under this clause.

(d) The Contractor shall report to the Contracting Officer, promptly and in written detail, each notice or claim or copyright infringement received by the Contractor with respect to all Subject Data delivered under this contract.

(e) Nothing contained in this clause shall imply a license to the Government under any patent or be construed as effecting the scope of any license or other right otherwise granted to the Government under any patent.

(f) Subject to the proviso of (b) above and unless otherwise limited below, the Government may duplicate, use, and disclose in any manner and for any purpose whatsoever, and have others so do, all Subject Data delivered under this contract.

(g) Notwithstanding any provisions of this contract concerning inspection and acceptance, the Government shall have the right at any time to modify, remove, obliterate or ignore any marking not authorized by the terms of this contract on any piece of Subject Data furnished under this contract.

(h) Data need not be furnished for standard commercial items or services which are normally or have been sold or offered to the public commercially by any supplier and which are incorporated as component parts in or to be used with the product or process being developed if in lieu thereof identification of source and characteristics (including performance specifications, when uecessary)

sufficient to enable the Government to procure the part or an adequate substitute, are furnished; and further, "proprietary data" need not be furnished for other items which were developed at private expense and previously sold or offered for sale, including minor modifications thereof, which are incorporated as component parts in or to be used with the product or process being developed if in lieu thereof the Contractor shall identify such other items and that "proprietary data" pertaining thereto which is necessary to enable reproduction or manufacture of the item or performance of the process. For the purpose of this clause "proprietary data" means data providing information concerning the details of a contractor's secrets of manufacture, such as may be contained in but not limited to its manufacturing methods or processes, treatment and chemical composition of materials, plant layout and tooling, to the extent that such information is not disclosed by inspection or analysis of the product itself and to the extent that the Contractor has protected such information from unrestricted use by others.

41. *Patent Rights.*—(a) As used in this clause, the following terms shall have the meaning set forth below:

(i) The term "Subject Invention" means any invention, improvement, or discovery (whether or not patentable) conceived or first actually reduced to practice either—

(A) in the performance of the experimental, developmental, or research work called for or required under this contract; or

(B) in the performance of any experimental, developmental, or research work relating to the subject matter of this contract which was done upon an understanding in writing that a contract would be awarded; provided that the term "Subject Invention" shall not include any invention which is specifically identified and listed in the Schedule for the purpose of excluding it from the license granted by this clause.

(ii) The term "Technical Personnel" means any person employed by or working under contract with the Contractor (other than a subcontractor whose responsibilities with respect to rights accuring to the Government in inventions arising under subcontracts set forth in (g), (h), and (i) below) who, by reason of the nature of his duties in connection with the performance of this contract, would reasonably be expected to make inventions.

(iii) The terms "subcontract" and "subcontractor" mean any subcontract or subcontractor of the Contractor, and any lower-tier subcontract or subcontractor under this contract.

(b) The Contractor agrees to and does hereby grant to the Government an irrevocable, nonexclusive, nontransferable, and royalty-free license to practice, and cause to be practiced by or for the United States Government, throughout the world, each Subject Invention in the manufacture, use and disposition according to law, of any article or material, and in the use of any method. No license granted herein shall convey any right to the Government to manufacture, have manufactured or use any Subject Invention for the purpose of providing services or supplies to the general public in competition with the Contractor or the Contractor's commercial licensees in the licensed field.

(2) With respect to:

(i) any Subject Invention made by other than Technical Personnel;

(ii) any Subject Invention conceived prior to, but first actually reduced to practice in the course of, any of the experimental, developmental, or research work specified in (a) (i) above; and

(iii) the practice of any Subject Invention in foreign countries; the obligation of the Contractor to grant a license as provided in (b) (1) above, to convey title as provided in (d) (ii) (B) or(d) (iv) below, and to convey foreign rights as provided in (e) below, shall be limited to the extent of the Contractor's right to grant the same without incurring any obligation to pay royalties or other compensation to others solely on account of said grant. Nothing contained in this Patent Rights clause shall be deemed to grant any license under any invention other than a Subject Invention.

(c) The Contractor shall furnish to the Contracting Officer the following information and reports concerning Subject Inventions which reasonably appear to be patentable:

(i) a written disclosure promptly after conception or first actual reduction to practice of each such Invention together with a written statement specifying whether or not a United States patent application claiming the Invention has been or will be filed by or on behalf of the Contractor;

(ii) interim reports at least every twelve months, commencing with the date of this contract, each listing all such Inventions conceived or first actually reduced to practice more than three months prior to the date of the report, and not listed on a prior interim report, or certifying that there are no such unreported Inventions; and

(iii) prior to final settlement of this contract, a final report listing all such Inventions including all those previously listed in interim reports.

(d) In connection with each Subject Invention referred to in (c)(i) above, the Contractor shall do the following:

(i) if the Contractor specifies that a United States patent application claiming such Invention will be filed, the Contractor shall file or cause to be filed such application in due form and time; however, if the Contractor, after having specified that such an application would be filed, decides not to file or cause to be filed said application, the Contractor shall so notify the Contracting Officer at the earliest practicable date and in any event not later than eight months after first publication, public use or sale.

(ii) if the Contractor specifies that a United States patent application claiming such Invention has not been filed and will not be filed (or having specified that such an application will be filed thereafter notifies the Contracting Officer to the contrary), the Contractor shall:

(A) inform the Contracting Officer in writing at the earliest practicable date of any publication of such Invention made by or known to the Contractor or, where applicable, of any contemplated publication by the Contractor, stating the date and identity of such publication or contemplated publication; and

(B) convey to the Government the Contractor's entire right, title, and interest in such Invention by delivering to the Contracting Officer upon written request such duly executed instruments (prepared by the Government) of assignment and application, and such other papers as are deemed necessary to vest in the Government the Contractor's right, title, and interest aforesaid, and the right to apply for and prosecute patent applications covering such Invention throughout the world, subject, however, to the rights of the Contractor in foreign applications as provided in (e) below, and subject further to the reservation of a non-exclusive and royalty-free license to the Contractor (and to its existing and future associated and affiliated companies, if any, within the corporate structure of which the Contractor is a part) which license shall be assignable to the successor of that part of the Contractor's business to which such Invention pertains;

(iii) the Contractor shall furnish promptly to the Contracting Officer on request an irrevocable power of attorney to inspect and make copies of each United States patent application filed by or on behalf of the Contractor covering any such Invention;

(iv) in the event the Contractor, or those other than the Government deriving rights from the Contractor, elects not to continue prosecution of any such United States patent application filed by or on behalf of the Contractor, the Contractor shall so notify the Contracting Officer not less than sixty days before the expiration of the response period and, upon written request, deliver to the Contracting Officer such duly executed instruments (prepared by the Government) as are deemed necessary to vest in the Government the Contractor's entire right, title, and interest in such Invention and the application, subject to the reservation as specified in (d) (ii) above; and

(v) the Contractor shall deliver to the Contracting Officer duly executed instruments fully confirmatory of any license rights herein agreed to be granted to the Government.

(e) The Contractor, or those other than the Government deriving rights from the Contractor, shall, as between the parties hereto, have the exclusive right to file applications on Subject Inventions in each foreign country within:

(i) nine months from the date a corresponding United States application is filed;

(ii) six months from the date permission is granted to file foreign applications where such filing had been prohibited for security reasons; or

(iii) such longer period as may be approved by the Contracting Officer.

The Contractor shall, upon written request of the Contracting Officer convey to the Government the Contractor's entire right, title, and interest in each Subject

Invention in each foreign country in which an application has not been filed within the time above specified, subject to the reservation of a nonexclusive and royalty-free license to the Contractor together with the right of the Contractor to grant sublicenses, which license and right shall be assignable to the successor of that part of the Contractor's business to which the Subject Invention pertains.

(f) If the Contractor fails to deliver to the Contracting Officer the interim reports required by (c) (ii) above, or fails to furnish the written disclosures for all Subject Inventions required by (c) (i) above shown to be due in accordance with any interim report delivered under (c) (ii) or otherwise known to be unreported, there shall be withheld from payment until the Contractor shall have corrected such failures either ten percent (10%) of the amount of this contract, as from time to time amended, or five thousand dollars ($5,000), whichever is less. After payment of eighty percent (80%) of the amount, of this contract, as from time to time amended, payment shall be withheld until a reserve of either ten percent (10%) of such amount, or five thousand dollars ($5,000), whichever is less, shall have been set aside, such reserve or balance thereof to be retained until the Contractor shall have furnished to the Contracting Officer:

(i) the final report required by (c) (iii) above;

(ii) written disclosures for all Subject Inventions required by (c) (i) above which are shown to be due in accordance with interim reports delivered under (c) (ii) above, or in accordance with such final reports, or are otherwise known to be unreported; and

(iii) the information as to any subcontractor required by (h) below.

The maximum amount which may be withheld under this paragraph (f) shall not exceed ten percent (10%) of the amount of this contract or five thousand dollars ($5,000), whichever is less, and no amount shall be withheld under this paragraph (f) when the amount specified by this paraparagraph (f) is being withheld under other provisions of this contract. The withholding of any amount or subsequent payment thereof to the Contractor shall not be construed as a waiver of any rights accruing to the Government under this contract. This paragraph (f) shall not be construed as requiring the Contractor to withhold any amounts from a subcontractor to enforce compliance with the patent provisions of a subcontract.

(g) The Contractor shall exert all reasonable effort in negotiating for the inclusion of a patent rights clause containing all the provisions of this Patent Rights clause except provisions (f) and (i) in any subcontract hereunder of three thousand dollars ($3,000) or more having experimental, developmental, or research work as one of its purposes. In the event of refusal by a subcontractor to accept such a patent rights clause, the Contractor shall not proceed with the subcontract without written authorization of the Contracting Officer or unless there has been a waiver of the requirement as hereinafter provided. The Contractor, if unable to comply with the requirement that such a patent rights clause be included in a subcontract after exerting all reasonable effort to do so, may submit to the Contracting Officer a written request for waiver or modification of such requirement. If, within thirty-five (35) days after the receipt of such request, the Contracting Officer does not mail or otherwise furnish the Contractor written denial of such request or notification that the Government requests the Contractor's cooperation with the Government, which the Contractor agrees to provide, in negotiating with the subcontractor for the acceptance of a suitable patent rights clause, the requirement shall be deemed to have been waived by the Contracting Officer as to all patent rights provisions with respect to Subject Inventions, except such provisions, if any, relating to the production or utilization of special nuclear material or atomic energy. Such request shall specifically state that the Contractor has used all reasonable effort to comply with said requirement and shall cite the waiver provision hereinabove set forth. The Contractor is not required, when negotiating with a subcontrator, to obtain in behalf of the Government any rights in Subject Inventions other than as provided herein. However, the Contractor is not precluded from separately negotiating with a subcontractor for rights in Subject Inventions for the Contractor's own behalf, but any costs so incurred shall not be considered as an allowable charge or cost under this contract. Reports, instruments, and other information required to be furnished by a subcontractor to the Contracting Officer under the provisions of such a patent rights clause in a subcontract hereunder may, upon mutual consent of the Contractor and the subcontractor (or by direction of the Contracting Officer) be furnished to the Contractor for transmission to the Contracting Officer.

(h) The Contractor shall, at the earliest practicable date, notify the Contracting Officer in writing of any subcontract containing one or more patent rights clauses; furnish the Contracting Officer a copy of each of such clauses; and notify the Contracting Officer when such subcontract is completed. It is understood that with respect to any subcontract clause granting rights to the Government in Subject Inventions, the Government is a third party beneficiary; and the Contractor hereby assigns to the Government all the rights that the Contractor would have to enforce the subcontractor's obligations for the benefit of the Government with respect to Subject Inventions. If there are no subcontracts containing patent rights clauses, a negative report is required. The Contractor shall not be obligated to enforce the agreements of any subcontractor hereunder relating to the obligations of the subcontractor to the Government in regard to Subject Inventions.

(i) When the Contractor shows that it has been delayed in the performance of this contract by reason of the Contractor's inability to obtain, in accorance with the requirements of (g) above, the prescribed or other authorized suitable patent rights clause from a qualified subcontractor for any item or service required under this contract for which the Contractor itself does not have available facilities or qualified personnel, the Contractor's delivery dates shall be extended for a period of time equal to the duration of such delay. Upon request of the Contractor, the Contracting Officer shall determine to what extent, if any, an additional extension of the delivery dates and increase in contract prices based upon additional costs incurred by such delay are proper under the circumstances; and the contract shall be modified accordingly.

EXHIBIT III(C)

Revised 15 October 1958

ARMED SERVICES PROCUREMENT REGULATION

9–107 Patent Rights.

9–107.1 General.

(a) Under any contract or modification thereof having experimental, developmental, or research work as one of its purposes, the Government should receive a royalty-free, nonexclusive license to practice or have practiced any inventions conceived or first actually reduced to practice in the course of performing such work or in the course of performing any prior experimental, developmental, or research work done upon the understanding in writing that a contract would be awarded. The contract cost or price should in no event be increased merely by reason of the inclusion of a patent rights clause.

(b) Except as expressly provided in this paragraph 9–107, and except with respect to contracts to be performed outside the United States, its Territories, its possessions, or Puerto Rico, patent license rights shall not be requested in the negotiation of contracts (other than contracts where the primary item of procurement is a license under or an assignment of a patent). It is the policy of the Department of Defense, except as otherwise provided in (a) above, to pay a reasonable compensation for the use of a valid patent enforceable against the Government, but the question of infringement, validity and enforceability of the patent shall be determined by personnel having cognizance of patent matters for the Department concerned.

9–107.2 License Rights—Domestic Contracts.

(a) *Exclusion of Inventions from the License Grant.* Upon request of the contractor, the contracting officer shall carefully consider and may exclude from the grant in the Patent Rights clause any invention which has not been actually reduced to practice, if it is covered by a United States patent issued or application for patent filed by or on behalf of the contractor prior to the award of a contract when he finds one or more of the following circumstances to be established:

(i) the contractor has expended sums in developing the invention (as represented by research and development costs and expenses for preparing and prosecuting the patent application) which are relatively large in comparison to the amount of the proposed contract or such portion of the proposed contract amount as can be allocated in advance for the development of such an invention (in determining the sums expended by the contractor there shall be included ouly amounts which can be allocated to the invention which is to be excluded; such sums shall not include the

entire cost of a research department or program which cannot be allocated as above provided);

(ii) the practicability of such an invention has been established as by engineering design;

(iii) the invention covers a basic material and it is not the purpose of the contract to develop such material; or

(iv) the invention is useful only for military purposes and the contractor does not have facilities for furnishing the item to the Government in production quantities.

Any inventions to be excluded from the license grant by reason of the foregoing circumstances shall be specifically identified and listed in the contract Schedule.

(b) *Contract Clause.* The clause set forth below shall be included in every contract having as one of its purposes experimental, developmental, or research work which is to be performed within the United States, its Territories, its possessions, or Puerto Rico, except as provided in ASPR 9–107.7 with respect to contracts on behalf of the National Aeronautics and Space Administration. See ASPR 16–809 for an approved form for optional use by contractors in reporting information required by paragraphs (c)(ii), (c)(iii), and (h) of the clause. In the administration of paragraph (e) of the clause, a request for conveyance of foreign rights to the Government is not required when the contractor does not file an application for patent in a foreign country under the conditions provided in that paragraph, unless the Government intends to apply for such patent.

PATENT RIGHTS.

(a) As used in this clause, the following terms shall have the meanings set forth below:

(i) The term "Subject Invention" means any invention, improvement, or discovery (whether or not patentable) conceived or first actually reduced to practice either—

(A) in the performance of the experimental developmental, or research work called for or required under this contract; or

(B) in the performance of any experimental, developmental, or research work relating to the subject matter of this contract which was done upon an understanding in writing that a contract would be awarded;

provided that the term "Subject Invention" shall not include any invention which is specifically identified and listed in the Schedule for the purpose of excluding it from the license granted by this clause.

(ii) The term "Technical Personnel" means any person employed by or working under contract with the Contractor (other than a subcontractor whose responsibilities with respect to rights accruing to the Government in inventions arising under subcontracts are set forth in (g), (h), and (i) below) who, by reason of the nature of his duties in connection with the performance of this contract, would reasonably be expected to make inventions.

(iii) The terms "subcontract" and "subcontractor" means any subcontract or subcontractor of the Contractor, and any lower-tier subcontract or subcontractor under this contract.

(b)(1) The Contractor agrees to and does hereby grant to the Government an irrevocable, nonexclusive, nontransferable, and royalty free license to practice, and cause to be practiced by or for the United States Government, throughout the world, each Subject Invention in the manufacture, use and disposition according to law, of any article or material, and in the use of any method. No license granted herein shall convey any right to the Government to manufacture, have manufactured, or use any Subject Invention for the purpose of providing services or supplies to the general public in competition with the Contractor or the Contractor's commercial licensees in the licensed fields.

(2) With respect to:

(i) any Subject Invention made by other than Technical Personnel;

(ii) any Subject Invention conceived prior to, but first actually reduced to practice in the course of, any of the experimental, developmental, or research work specified in (a)(i) above; and

(iii) the practice of any Subject Invention in foreign countries;

the obligation of the Contractor to grant a license as provided in (b)(1) above, to convey title as provided in (d)(ii)(B) or (d)(iv) below, and to convey foreign rights as provided in (e) below, shall be limited to the extent of the Contractor's right to grant the same without incurring any obligation to pay royalties or other compensaion to others solely on account of said grant. Nothing contained in this Patient Rights clause shall be deemed to grant any license under any invention other than a Subject Invention.

(c) The Contractor shall furnish to the Contracting Officer the following information and reports concerning Subject Inventions which reasonably appear to be patentable:

(i) a written disclosure promptly after conception or first actual reduction to practice of each such Invention together with a written statement specifying whether or not a United States patent application claiming he Invention has been or will be filed by or on behalf of the Contractor;

(ii) interim reports at least every twelve months, commencing with the date of this contract, each listing all such Inventions conceived or first actually reduced to practice more than three months prior to the date of the report, and not listed on a prior interim report, or certifying that there are no such unrepoted Inventions; and

(iii) prior to final settlement of this contract, a final report listing all such Inventions including all those previously listed in interim reports.

(d) In connection with each Subject Invention referred to in (c)(i) above, the Contractor shall do the following:

(i) if the Contractor specifies that a United States patent application claiming such Invention will be filed, the Contractor shall file or cause to be filed such applica-

tion in due form and time; however, if the Contractor, after having specified that such an application would be filed, decides not to file or cause to be filed said application, the Contractor shall so notify the Contracting Officer at the earliest practicable date and in any event not later than eight months after first publication, public use or sale.

(ii) if the Contractor specifies that a United States patent application claiming such Invention has not been filed and will not be filed (or having specified that such an application will be filed thereafter notifies the Contracting Officer to the contrary), the Contractor shall:

(A) inform the Contracting Officer in writing at the earliest practicable date of any publication of such Invention made by or known to the Contractor or, where applicable, of any contemplated publication by the Contractor, stating the date and identity of such publication or contemplated publication; and

(B) convey to the Government the Contractor's entire right, title, and interest in such Invention by delivering to the Contracting Officer upon written request such duly executed instruments (prepared by the Government) of assignment and application, and such other papers as are deemed necessary to vest in the Government the Contractor's right, title, and interest aforesaid, and the right, to apply for and prosecute patent applications covering such Invention throughout the world, subject, however, to the rights of the Contractor in foreign applications as provided in (e) below, and subject further to the reservation of a nonexclusive and royalty-free license to the Contractor (and to its existing and future associated and affiliated companies, if any, within the corporate structure of which the Contractor is a part) which license shall be assignable to the successor of that part of the Contractor's business to which such Invention pertains;

(iii) the Contractor shall furnish promptly to the Contracting Officer on request an irrevocable power of attorney to inspect and make copies of each United States patent application filed by or on behalf of the Contractor covering any such Invention;

(iv) in the event the Contractor, or those other than the Government deriving rights from the Contractor, elects not to continue prosecution of any such United States patent application filed by or on behalf of the Contractor, the Contractor shall so notify the Contracting Officer not less than sixty days before the expiration of the response period and, upon written request, deliver to the Contracting Officer such duly executed instruments (prepared by the Government) as are deemed necessary to vest in the Government the Contractor's entire right, title, and interest in such Invention and the application, subject to the reservation as specified in (d)(ii) above; and

(v) the Contractor shall deliver to the Contracting Officer duly executed instruments fully confirmatory of any license rights herein agreed to be granted to the Government.

(e) The Contractor, or those other than the Government deriving rights from the Contractor, shall, as between the parties hereto, have the exclusive right to file applications on Subject Inventions in each foreign country within:

(i) nine months from the date a corresponding United States application is filed;

(ii) six months from the date permission is granted to file foreign applications where such filing had been prohibited for security reasons; or

(iii) such longer period as may be approved by the Contracting Officer.

The Contractor shall, upon written request of the Contracting Officer convey to the Government the Contractor's entire right, title, and interest in each Subject Invention in each foreign country in which an application has not been filed within the time above specified, subject to the reservation of a nonexclusive and royalty-free license to the Contractor together with the right of the Contractor to grant sublicenses, which license and right shall be assignable to the successor of that part of the Contractor's business to which the Subject Invention pertains.

(f) If the Contractor fails to deliver to the Contracting Officer the interim reports required by (c)(ii) above, or fails to furnish the written disclosures for all Subject Inventions required by (c)(i) above shown to be due in accordance with any interim report delivered under (c)(ii) or otherwise known to be unreported, there shall be withheld from payment until the Contractor shall have corrected such failures either ten percent (10%) of the amount of this contract, as from time to time amended, or five thousand dollars ($5,000), whichever is less. After payment of eighty percent (80%) of the amount of this contract, as from time to time amended, payment shall be withheld until a reserve of either ten percent (10%) of such amount or five thousand dollars ($5,000), whichever is less, shall have been set aside, such reserve or balance thereof to be retained until the Contractor shall have furnished to the Contracting Officer:

(i) the final report required by (c)(iii) above;

(ii) written disclosures for all Subject Inventions required by (c)(i) above which are shown to be due in accordance with interim reports delivered under (c)(ii) above, or in accordance with such final reports, or are otherwise known to be unreported; and

(iii) the information as to any subcontractor required by (h) below.

The maximum amount which may be withheld under this paragraph (f) shall not exceed ten percent (10%) of the amount of this contract or five thousand dollars ($5,000), whichever is less, and no amount shall be withheld under this paragraph (f) when the amount specified by this paragraph (f) is being withheld under other provisions of this contract. The withholding of any amount or subsequent payment thereof to the Contractor shall not be construde as a waiver of any rights accruing to the Government under this contract. This paragraph (f) shall not be construed as requiring the Contractor to withhold any amounts from a subcontractor to enforce compliance with the patent provisions of a subcontract.

(g) The Contractor shall exert all reasonable effort in negotiating for the inclusion of a patent rights clause containing all the provisions of this Patent Rights clause except provisions (f) and (i) in any subcontract hereunder of three thousand dollars ($3,000) or more having experimental, developmental, or research work as one of its purposes. In the event of refusal by a subcontractor to accept such a patent rights clause, the Contractor shall not proceed with the subcontract without written authorization of the Contracting Officer or unless there has been a waiver of the requirement as hereinafter provided. The

Contractor, if unable to comply with the requirement that such a patent rights clause be included in a subcontract after exerting all reasonable effort to do so, may submit to the Contracting Officer a written request for waiver or modification of such requirement. If, within thirty-five (35) days after the receipt of such request, the Contracting Officer does not mail or otherwise furnish the Contractor written denial of such request or modification that the Government requests the Contractor's cooperaion with the Government, which the Contractor agrees to provide, in negotiating with the subcontractor for the acceptance of a suitable patent rights clause, the requirement shall be deemed to have been waived by the Contracting Officer as to all patent rights provisions with respect to Subject Inventions, except such provisions, if any, relating to the production or utilization of special nuclear material or atomic energy. Such request shall specifically state that the Contractor has used all reasonable effort to comply with said requirement and shall cite the waiver provision hereinabove set forth. The Contractor is not required, when negotiating with a subcontractor, to obtain in behalf of the Government any rights in Subject Inventions other than as provided herein. However, the Contractor is not precluded from separately negotiating with a subcontractor for rights in Subject Inventions for the Contractor's own behalf, but any costs so incurred shall not be considered as an allowable charge or cost under this contract. Reports, instruments, and other information required to be furnished by a subcontractor to the Contracting Officer under the provisions of such a patent rights clause in a subcontract hereunder may, upon mutual consent of the Contractor and the subcontractor (or by direction of the Contracting Officer) be furnished to the Contractor for transmission to the Contracting Officer.

(h) The Contractor shall, at the earliest practicable date, notify the Contracting Officer in writing of any subcontract containing one or more patent rights clauses; furnish the Contracting Officer a copy of such clauses; and notify the Contracting Officer when such subcontract is completed. It is understood that with respect to any subcontract clause granting rights to the Government in Subject Inventions, the Government is a third party beneficiary; and the Contractor hereby assigns to the Government all the rights that the Cotractor would have to enforce the subcontractor's obligations for the benefit of the Government with respect to Subject Inventions. If there are on subcontracts containing patent rights clauses, a negative report is required. The Contractor shall not be obligated to enforce the agreements of any subcontractor hereunder relating to the obligations of the subcontractor to the Government in regard to Subject Inventions.

(i) When the Contractor shows that it has been delayed in the performance of this contract by reason of the Contractor's inability to obtain, in accordance with the requirements of (g) above, the prescribed or other authorized suitable patent rights clause from a qualified subcontractor for any item or service required under this contract for which the Contractor itself does not have available facilities or qualified personnel, the Contractor's delivery dates shall be extended for a period of time equal to the duration of such delay. Upon request of the Contractor, the Contracting Officer shall determine to what extent, if any, an additional extension of the delivery dates and increase in contract prices based upon additional costs incurred by such delay are proper under the circumstances; and the contract shall be modified accordingly.

9–107.3 License Rights—Foreign Contracts. A patent rights clause shall be included in every contract having as one of its purposes experimental, developmental, or research work which is to be performed outside the United States, its Territories, its possessions, or Puerto Rico. The clause set forth below may be used except as provided in ASPR 9–107.7 with respect to contracts on behalf of the National Aeronautics and Space Agency; however, any other clause tailored to meet requirements peculiar to foreign procurement may be used in lieu thereof *provided* it incorporates the principles of the clause below, except that principles of paragraphs (c) and (d) thereof may be omitted if, in the opinion of the contracting officer (on a case-by-case basis), the inclusion of withholding or other enforcement provisions is neither desirable nor necessary.

(Prepared statement of Mr. Reichard follows:)

PREPARED STATEMENT ON BEHALF OF AEROJET-GENERAL CORP., PRESENTED BY EMERSON S. REICHARD, JR., DIRECTOR OF CONTRACTS

Aerojet-General Corp. wishes to express its appreciation for the opportunity to present its views before this committee.

We understand that your committee is primarily interested at this time in determining whether the policy of certain Government agencies, in particular the Department of Defense, with respect to the disposition of patent rights arising out of Government sponsored research and development contracts, should be continued. Such contracts now permit retention of title to inventions arising out of such research by the contractor, subject to the granting of a nonexclusive royalty-free license to the Government. This arrangement effectively prohibits the establishment of any monopoly on such inventions with respect to sales to the United States Government, but permits the retention of a commercial monopoly in the contractor with respect to such inventions.

It has been suggested that the continuance of this policy will eventually result in a concentration of economic power in a few very large firms to the exclusion of small business. We do not believe that this will come about.

This contrary opinion is based on our own experience as a company almost exclusively engaged in defense activities. In pursuance of this, we wish to

present a brief summary of our experience in respect to patent rights and Government contracts since our beginning in 1942 as a small business.

Aerojet-General Corp. has been granted a total of 110 United States patents of which 87 were either made or conceived in the course of Government sponsored research. We have currently pending before the United States Patent Office 307 patent applications of which 250 were either made or conceived in the performance of Government-sponsored research. Our records show that of all the inventions for which Aerojet-General Corp. is entitled to obtain patent protection, including those for which patent applications have not been filed as yet, some 60 percent were either made or conceived in the performance of Government-sponsored research and development. Since this committee is probably most interested in the commercial advantage obtained by us as a Government contractor engaged in research and development activities, we consider it appropriate and important to point out that of our 400 or more pending and issued United States patents only three products are involved of any significance which can properly be described as "commercial." These are our 15KS–1000 commercial JATO unit, our 15NS–250 Junior JATO unit and a pressure sensing device which is the principal product of a small business in Pasadena, Calif. whose principal customer is ultimately the U.S. Government. We feel that our experience in terms of acquiring a commercial patent position is significant and demonstrates the fact that, although a substantial number of inventive contributions have been made by Aerojet-General Corp. in the performance of research and development contracts, it has not resulted in the creation of any substantial commercial monopoly. We might go further and state that in our opinion whether or not we were able to obtain patent protection for our commercial JATO units, (for which no patents have been issued to date), our sales of these items would not have been affected in any respect. This is emphasized by the fact that patents protecting these units have not been granted to date. Nor do we think that the sales of the small business to which we referred above have been affected in the least way by the issuance of a patent for the device which is their principal product. The truth of this assertion is demonstrated by the fact that the company to which we refer was established without patent protection, although it has since acquired the exclusive rights in the commercial field to the device mentioned.

Why then does Aerojet-General Corp. continue to file patent applications when it obtains no commercial advantage? There are a number of reasons for this. One, of course, is the hope that at some future time a commercial market for one or more of the products involved will be developed, which would permit this company to broaden its line of commercial products. Another important reason is the fact that we are faced with the problem of preventing others from rediscovering an invention made by us in the performance of classified work and obtaining a patent which would hinder or impair our activities under United States Government contracts or induce the Government to grant production contracts to the later discoverer by reason of the patent obtained by him. This problem stems from the fact that an organization such as ours is not permitted in the usual course of events to publish articles disclosing simple improvements and discoveries so as to place them within the public domain because of security restrictions governing most of our work. Thus the only certain way open to us for preventing the acquisition of an adverse patent by another and perhaps later discoverer is to file an application before the U.S. Patent Office to obtain a firm record date for the invention, thus establishing our priority. Another reason, often overlooked, is the professional stimulus which results from the maintenance of an aggressive patent policy by a corporation such as Aerojet-General Corp. The professional esteem which is associated with the issuance of a U.S. patent to an inventor as well as the modest financial remuneration given the inventor under Aerojet-General Corp's Patent Award Plan is considered by us to be a substantial stimulus to original and inventive thinking in the performance of our work. We consider this stimulus important in view of the practical impossibility of monitoring the thoughts and work of individuals in an organization as large as ours to be certain that all inventions are promptly reported so that appropriate action can be taken toward obtaining patent protection and also to insure that inventive contributions are brought to the attention of those who are in a position to implement and use them to advace the state of the art.

We think it most important to bring to your attention our experience in subcontracting activities, in particular our subcontracting relationships with small businesses. In 1958 about 55 percent of our total business was derived from

Government-sponsored research and development contracts. In 1958 about 46 percent of all of our total work was subcontracted. Of this amount some 70 percent went to small businesses. Of the total dollar amount of Government-sponsored research and development carried out by Aerojet-General in 1958, we estimate that 30 percent was further subcontracted to small business.

In all of such subcontracts the same disposition of patent rights is made as in the case of Government prime contractors. In other words, all commercial rights to inventions made in the course of the work are retained by the subcontractor. For our own protection, we customarily request a nonexclusive right to practice such inventions in the commercial field, but never insist upon such a grant.

In light of our experience, we do not feel that a disproportionate amount of Government research and development contracts is going to a few large concerns. The committee will be interested in knowing that we have recently established a Coordinator for Small Business and Labor Surplus Areas at our Sacramento Plant for the express purpose of aiding and counseling small businesses in obtaining an even greater share of the work subcontracted by Aerojet-General Corp.

We would like at this time to elaborate on the reasons for this conclusion.

First of all, it is to be noted that the Department of Defense does not give title to inventions to Government contractors. It is important to keep in mind the fact that rights in inventions made by the contractor are a part of the consideration bargained for by the Government. The question of disposition of patent rights arises only in research and development contracts which are, generally speaking, high risk, low potential, and low profit contracts, the maximum profit being on the order of 7 percent of cost. There is no assurance that production orders will result from such work and there is no assurance that production orders will be placed with the original contractor in any event. Years of experience and the know-how, which is the life blood of corporate existence, becomes freely available to competitors in return for a maximum of a 7 percent fee. Small businesses and large can freely draw upon the experience and know-how embodied in such developments in competing with the orignator of the same for the manufacture and sale of the product to the Government. The only thing left to the originator is the commercial market which in most instances is relatively insignificant in relation to the military market.

The low profit margins and the lack of any assurance of production orders is in our opinion the explanation for the fact that the greater portion of research and development contracts go to the larger companies. There is obviously little incentive for small businesses to have their generally limited research staffs devote their time to work which is not likely to result in production business. The economic position, and in particular the productive capabilities of big business as compared to small, place small business at a disadvantage in competing for contracts for the production of items licensed to the Government. For this reason, small businesses tend to develop their own proprietary products, necessarily at their own expense, to insure future production rather than actively seek low profit research and development defense contracts, realizing that the Govenrment must seek to obtain the goods it needs at the lowest price. It is important in this connection to note that commercialization of products, especially those having military uses, is beneficial to society as a whole and to the Government in particular by virtue of the reduced costs which inevitably accompany a broadened production base.

Having a proprietary position gives small business some assurance (please note, Government purchasing agents are not bound to respect patent rights and often do not) of continuing production business. Only in those infrequent instances where the research involved may lead to a product which has both a military and a commercial potential can small business benefit substantially in accepting a Government contract because then there is some chance of obtaining production business as a result of the commercial patent position which the small business contractor is permitted to retain. Obviously, if contractors are totally deprived of the commercial patent rights, an even greater proportion of Government financed research will be left to the larger firms and small business will be compelled to an even greater extent to sponsor its own research in order to acquire the proprietary position which they must have in order to compete.

Our contention can be summed up as follows:

1. So-called commercial patent rights derived from Government-sponsored research have had little to do with the growth of the larger firms.

2. Small businesses obtain a substantial portion of Government research and development contracts by way of subcontracts and obtain the same commercial rights in inventions as do prime contractors.

3. Large firms with substantial production capabilities do not rely upon patents as a rule for the maintenance of their positions because the principal source of their competitive greatness is derived from their economic strength.

4. Small businesses are in most instances dependent upon a proprietary position of some sort whether it be patents or unique know-how for their continued existence and future growth. They could not survive and grow if forced to compete with so-called big business in an open freely competitive market.

5. Because of the relatively low profits involved, particularly since personnel are required whose talents may be used for more profitable activities, there is little incentive for most small businesses to seek Government research and development contracts other than the hope of acquiring a patent position in the commercial field.

6. The acquisition of commercial patent rights for developments made in the performance of Government-sponsored research is, of course, an important and attractive inducement. But, it is far more important to small businesses than to large. A change in Government policy eliminating this incentive would undoubtedly result in an increase in the cost of such work and would have serious and more far-reaching effects upon small business.

We strongly urge your committee to take positive action to preserve and maintain the existing policies of the Department of Defense with respect to patent rights and to consider, in the light of this testimony, the advisability of perpetuating the policies relative to patents and inventions embodied in the National Aeronautics and Space Act of 1958 and the Atomic Energy Act of 1954. We invite particular attention to the very limited number of small businesses engaged in the nuclear field and suggest that this is largely the result of the almost complete elimination of private patents in this field.

We think that the patent system of the United States which has contributed greatly to the industrial strength of this country has been badly maligned in recent years and woefully underestimated in terms of its value to society. We feel that the principles that have made this system work and which have made our country great have somehow been forgotten. The same principles that have made our patent system work for well over a century apply with equal force to the issue before this committee. Private patents are essential to the creation and establishment of new business enterprises. Like infants, small businesses must be protected if they are to mature. Destroy the ability to acquire a proprietary position in any field and you will find higher mortality rates in all.

Senator LONG. We have two witnesses. I don't know whether we will be able to hear both of them today. If either Mr. Robert Lent or Mr. Burton Smith, for one reason or the other, cannot be available tomorrow, then I will take that witness.

Mr. LENT. Mr. Chairman, I am Mr. Lent. I have appointments in New York tomorrow.

Senator LONG. Fine. Take the witness seat there, Mr. Lent.

STATEMENT OF ROBERT R. LENT, MARKETING CONSULTANT, STRATEGIC INDUSTRIES ASSOCIATION, LOS ANGELES, CALIF.; ACCOMPANIED BY HARVEY RIGGS, PRESIDENT, INTERNATIONAL ELECTRONIC RESEARCH CORP., AND WILLIAM PATTERSON, VICE PRESIDENT, ELECTRODYNAMICS CORP.

Mr. LENT. Mr. Chairman, I would like to have the record show that Mr. Harvey Riggs, president of the International Electronic Research Corp., and also the president of the Strategic Industries Association, is here with me, Mr. William Patterson, also a member of Strategic Industries Association, and a vice president of the Electrodynamics Corp.

Mr. J. P. Perry, who is the president of the Eastern Rotorcraft Corp., in Doylestown, Pa., is here.[9]

Mr. Marshall Lewis, vice president of marketing for the Eastern Rotorcraft Corp. is in the audience.

Mr. Robert L. Davis, vice president of Davis Aircraft, of Philadelphia, is present, and Mr. David Saunders, legal counsel for the Strategic Industries is present.

Strategic Industries is a group of organizations in excess of 100 companies who primarily are involved in defense activities. They are by nature small. Our largest corporation, I think, is approximately $10 million and less than 1,000, but our average corporation is approximately $300,000 a year.

We are in contact with many corporations throughout the country who resemble us in size and effort, and we believe that our position represents approximately 6,000 small companies in the United States who do business with the Government on defense and space activities.

I will brief my speech because I think that many of the points can be developed more likely in questions.

It is my earnest desire in this meeting with you today to demonstrate to you that beyond any question our Federal patent policies, far from aiding "big business" through their liberality, actually most seriously impair our rate of scientific and technological progress in the missile weapon systems, and space exploration fields through their tight repression of creativity.

All business, big and small, today suffers most drastic compromise to its creative productivity through virtual elimination of the incentive for progress engendered by the recent rapid erosion of our constitutional patent privilege.

I do not exaggerate, Mr. Chairman, when I summarize Federal patent policy in this field as one which says: "We will take from you the fruits of your labors, while we beg you to increase them with all your energies." This approach to our scientific community borders perilously close to those of foreign ideologies with which we are locked in uncompromising conflict.

The companies for whom I speak today have suffered the consequences of present patent practices in usurpation of their present patent privileges in award of contracts, in renegotiation of their profits away from them, in disallowance of direct cost chargeable no place else, and in ultimate complete frustration of their creativity and even their desire to be of further direct service to the country.

Today the tangible results of this confiscatory Federal patent policy is manifest in the flat refusal of many of my principals together with hundreds of similar small business firms in the defense fields across the Nation to accept Government research and development assignments.

So let us see how this is so and examine its consequences to the defense effort. One of the companies with which I am associated typifies not only the member of our association but hundreds of like firms across the Nation. It was founded in the immediate postwar years on the basis of a patented device which measures force pressure acceleration in a simple, accurate way under severe environmental conditions.

[9] See app. VII, p. 419, for Mr. Perry's statement.

The company was a success from the outset and today employs nearly 1,000 people in 5 different plants and produces approximately $10 million a year in sales volume in this patented device.

I might add that not one dollar of Government money was ever expended in the development of this invented device. Today it enjoys first rank in its particular proprietary field. To the uninitiated this portends monopoly with associated fat profits and security against competitive inroads on its market through its patent protection. Nothing could be further from the truth, and such thinking discounts the facts of business mechanics in the technical fields.

This company produces a patented device making use of a particular scientific principle, but there exists 12 other scientific principles through the use of which this same job is being performed. This means that 12 to 15 other companies compete for sales in this market, each producing patented proprietary products.

Obviously the competition in this specialized field is between scientific principles and not patented gadgets. Thus quite the reverse of the lay opinion, this company's patented proprietary rights not only do not tolerate a monoply of its market, but barely give it sufficient support for survival in a highly competitive field. There simply cannot exist a single vastly superior idea in the scientific field which corners a whole market.

The inevitable decision of the practical businessman, whose sole incentive is profit, is to simply reject such programs, and here I speak of research and development, and invest his company's money in continuous incremental improvements in its existing products with the resulting sacrifice to the rate of scientific progress of which it is fully capable.

This situation extends impartially across the small, medium, and big-business echelons of our economy. Big and small business in the weapons-systems field are inextricably intertwined and inseparable, each relying on the other for major support.

We most seriously question that legislation can be devised which restricts one while relieving the other since both big and small business will be affected equally by the provisions of new legislation in this field directly or indirectly. Both small and big business therefore hold the Government in fundamental error in its concept that the completed weapon and all its component parts are the property of the Government, with legal right to place their production among any of the thousands of available competitive bidders, most of them without laboratory facilities or even engineering departments.

Thus, in essence, my association believes that existing Federal policies and regulations are most grievously obstructing the pace of this Nation's weapons systems and space-exploration efforts and are clearly in violation of the content and the intent of article 1, section 8, of the Constitution, and are literally creating and aggravating the conditions they are designed to alleviate. They are not saving the Government money, since they force the Government to sponsor development programs at great cost that private industry would happily sponsor if guaranteed normal patent rights in the products thereby produced. They are not availing to the Government the best brains and talents of the Nation, which are distributed as liberally throughout small business as in big business, because these talents cannot be called forth without adequate incentive.

Lastly, and most seriously in the policy sense, present Federal patent policies have no foundation in purpose or reason: they place the United States Government in the position of owning vast quantities of patents for which it has no conceivable internal use, since it does not manufacture, market, nor otherwise make direct contribution to the American economy. The practice must inevitably produce the spectacle of the Government suing one of its citizens for infringement of a patent owned by all the people—and therefore of no competitive value to anyone—it implies ultimate licensing of the manufacture of commercial products in the marketplace at a profit to the Government, and it must eventually create another giant bureaucracy for the administration of the Government's participation in the heretofore private enterprise of the Nation.

We submit, Mr. Chairman, that none of these things constitute a proper role of Government in our society.

On behalf of the Strategic Industries Association, I urge upon this subcommittee the preparation of legislation which simply reaffirms the right of the citizen to exclusive reward for his inventions and discoveries for a limited time, other Federal laws, regulations, or administrative practices to the contrary notwithstanding. Only such a simple, forthright redeclaration can salvage the constitutional guarantee now almost lost and return to the inventive citizen, so sorely needed in today's scientific battle, the rights granted him by his Founding Fathers.

Mr. Chairman, that completes my formal statement. I would like to comment on a couple of things before the questions, and one is the term "proprietary." Patent and monopoly have been used here quite a bit today, and many times they are used indiscriminately. I would like to state in lay language what we mean when we use the terms "proprietary, patent, and monopoly."

As far as patent is concerned, that is a discovery or an invention of an entirely new principle or an entirely new mechanism which has never existed before. Therefore the inventor is bringing to society something that society has never had before.

A proprietary product is a novel idea or a novel approach to a design based upon established principles of science—these are not eligible for patent because there is nothing new in the use of the scientific principle. However, the clever approach in the use of that scientific principle makes it possible for the product designer to obtain a particular advantage over the old designs.

Now, permit me to give you an example. Valves have been with us for generations. However, recently an organization that is a member of Strategic Industries came up with a brand new and novel approach on a mechanical valve. There was nothing to be patented on it, but it performed a role that no other valve has been capable of doing, and it was for use with low-temperature fluids, such as liquid oxygen. This is a unique capability resulting from their creative approach to something.

Now, the trade-secret law says that such things are the property of the individual and are to be protected by law, such as drawings, the skills of assembly, or the skills of calibration and other such data. This is a proprietary right.

Now, when you talk about proprietary rights or proprietary items, you have to feed in the reliability factor. Let's say we are talking about cameras. I remember a specific case when I was a member of the Air Force. We brought a camera back from Germany, and we could find no one in the United States for several months who could even remotely approach the re-creation of this camera because of the fine tolerances and the unique capabilities required. It happens frequently that you will come up with a camera that looks exactly like any other camera, but because of your particular know-how or the tolerances that you apply in certain areas or some special skill you make it work when no one else can. So as a result this is what you talk about when you talk about proprietary.

Now, monopoly—monopoly is the position in which you are denying to the public the products or commodities that are available to society. I think the salt monopoly in England in the 1600's gives an example of it, where salt was denied to the people because the King granted to preferred subjects the right to sell all salt, and some people went without unless they paid the asker's price. So, in this respect patent and a monopoly have no relationship whatsoever.

A patent is something that gives to society. A monopoly is something that takes away from society. So I think that it is important to realize the differences as we apply them in the scientific and technical field, and especially in the space and missle activities.

That completes my comments there.

Senator LONG. Would you provide this committee with a list of those people who are members of your Strategic Industries Association?

Mr. LENT. Yes, sir; I will. I will have to send it by mail, sir, because the records are back there.[10]

Senator LONG. Are you an executive of one of those corporations?

Mr. LENT. I am a marketing executive of one of the corporations, which is a member.

Senator LONG. Now, what position is that? You say you are the marketing agent?

Mr. LENT. I am director of marketing for Statham Instruments, Inc., on the west coast. Statham Instruments is a member of the Strategic Industries Association.

Senator LONG. Does your company sell primarily to the Government?

Mr. LENT. Yes; it does.

I would say that approximately 65 percent of its products are sold to prime contractors of the Government as opposed to directly to the Government. We sell on a fixed-price basis.

Senator LONG. Do you have R. & D. contracts, your company?

Mr. LENT. This particular company does not. Some of our companies do have.

Senator LONG. Has it ever had any?

Mr. LENT. The Statham Co. has never had one and never will accept one.

Senator LONG. It won't accept one. What does it manufacture?

[10] Retained in committee files.

Mr. LENT. Unbonded strain gage transducers, which are used in the measurements of acceleration and pressure.

Senator LONG. I take it it is contrary to your company's policy to accept a contract wherein the Government would have any rights to use anything that is developed under that contract?

Mr. LENT. The Statham Instruments represents the perennial dream of almost all of us, and that is the idea of inventing something, getting it patented, and then making a million dollars. Statham literally did this. He has made a million dollars with a portfolio of 50 patents.

Senator LONG. What is that product?

Mr. LENT. Unbonded strain gage transducers.

Senator LONG. What are they?

Mr. LENT. I may suggest, Senator, that you may liken it to the pick-up to the phonograph. It does principally the same thing. It measures pressure in a dynamic situation and changes it to electrical energy and transmits that energy back to a receiving instrument that records what is happening in this space of time, be it milliseconds or be it hours.

Senator LONG. Let me ask you this: If your company objects and doesn't want a Government contract, do you have any particular objection to somebody else taking one?

Mr. LENT. No; I do not. In this particular situation perhaps it would be interesting to know why we refuse to take Government contracts. We do not feel that for a quick buck from the Government that we should give away 15 years of knowledge, and this is in essence what the Government requests.

Senator LONG. Do you have people work for you in your research and development?

Mr. LENT. Yes; we do. I would say that it is typical of most of the companies with Strategic Industries to turn back as high as 20 percent of our profit dollar into research and development to keep abreast of the market and to keep abreast of the problems relating to it.

Senator LONG. Here is the point I want to ask you. Do you have a contract with those people that what they discover belongs to your company?

Mr. LENT. Yes; we do.

Senator LONG. Is there anything immoral about that contract you have with them that they turn over those rights to you when they discover or invent something?

Mr. LENT. Well, I think, Senator, that this question implies that the relationship of the Government with its contractors is the same as employer and employee.

Senator LONG. First, let's answer the question and then qualify your answer, if you would. What, if anything, is immoral about the part of your contract that requires those whom you pay to do research and development for you to turn over to your company the product of that research and development?

Mr. LENT. Because in return for their creativity my company is giving them security. They are giving them promotions, and they are giving them prestige as far as their position with that company. I have not yet noticed the Government give any company assurances

that they will have continued security in doing business with the Government. I have never seen them give high prestige, and I have never seen them give us any preferred position in the market just because we were creative. Therefore I don't believe you can liken the relationship between a company and its customer, which is in essence the relationship between the Government and the company and the company and its employee.

Senator LONG. Yes; but let me ask you this question: Can't all those things be put in the one term "contract consideration," which is that you pay for what you are getting? Sometimes you pay in cash, sometimes you pay in fringe benefits, but it is all covered by the old quid pro quo that you are getting what you pay for.

Mr. LENT. Providing it is completely understood that that remuneration is adequate and just and it is not usurped by some phrases.

May I give you an example? You were speaking of section 305 of the Space Act. In that particular case permit me to draw an analogy for you. Let us assume that I represent a company that manufactures transducers. I approach a contractor who has a contract with NASA or with the Atomic Energy Commission, and they advise me that they have a particular problem, a particular pressure parameter in a missile or bomb that they need to have measured, and they have been unable to find anything that will be able to do it. They will say, "Mr. Lent, do you have knowledge of anything that will do this?" My answer in this particular case is "No," but I ask to be permitted to go back and discuss it with my engineers and we will see what we can do. I go back to my engineers; talk to them; and out of a clear blue sky one of my boys gets a brainstorm, and he comes up with a unique discovery or an invention. We spend our money; we use our personnel; and we take this concept and build it into a prototype. I then walk into this organization again and I say, "Here. This may do it. I am not sure, but here it is free. Test it, evaluate it, and if you like it, it comes packaged 12 to a box and we sell it for $300 apiece."

At that moment, Senator, the U.S. Government usurped our patent rights, because if you read the language of the law it says any contract, any agreement, or any understanding. That tacit agreement—that if I were to come up with a solution they would buy it. That, under the law, gave the U.S. Government the patent, the title to the patent in that particular instance.

Now, I don't believe, and I am sure that most small business does not agree, that this is just.

Senator LONG. Let me just see if I understand the position you state. If I understand the position, you are saying here that when an inventor in this country discovers any particular thing, assuming he is the first one to get it, that he should be in the position to get a complete patent which gives him a patent monopoly on that, and I think I am using the word "monopoly" correctly there, because at that moment it belongs completely to him.

Mr. LENT. I dispute the term "monopoly."

Senator LONG. He is able to get a complete, unqualified patent; is that your position?

Mr. LENT. Yes; that is right.

Senator LONG. You feel that the law should be such that he can hold back as long as he wants to and bargain for any terms and conditions he wants for it?

Mr. LENT. Mr. Chairman, I refer you back to the language of the Constitution. It dosen't say that he can hold it as long as he wants to. There is a specific time set up, and if you desire, permit me to read it. Article 1, section 8. "Congress shall have the power to promote the progress of science and the useful arts by securing for limited times to authors and inventors the exclusive rights to their respective writings and discoveries."

Senator LONG. Now, I hope you and I read that the same way because that to me says we have the power to issue a complete patent if we want to. It dosen't say you have those rights. We can give it to you. Is that what it means to you, or does it mean something else?

Mr. LENT. It means something else to me. I am not an authority on constitutional law, but it is my understanding from reading the notes to this particular section that the phrase "Congress shall have the power" is a limiting phrase and negative phrase, not a positive phrase. Congress shall have the power to do these things that are outlined in the Constitution and nothing more. So therefore I do not believe that Congress can toss it aside if they so desire.

Senator LONG. You interpret that language to mean when it says "Congress shall have the power," it means that Congress must do this?

Mr. LENT. No, Congress is limited to the powers as set forth in the Constitution.

Senator LONG. So it says that Congress has the power to grant you a monopoly. The Congress has the power to grant you a patent. Congress has the power to grant you a law under which you can get it. It doesn't say you have it without law.

Mr. LENT. Isn't it true, Mr. Chairman, that the reason that the Constitution has survived the test of time is because it was written in broad principles and the intent of Congress or the intent of the Constitution was that people should be protected for a giving period of time when they brought forth their creative activity? Now, is that not the intent of the Constitution?

Senator LONG. It seems to me that you are assuming that Congress has the power to do something. That doesn't mean we have to do it. We have the power to declare war, but we are not forced to declare war on somebody.

We have to decide whether we want to do it or not. Don't you think the reason Congress was giving this power was that Congress would consider what the public needs were and would exercise that power in the public interest and to preserve and promote the public welfare?

Mr. LENT. Yes, I do, but I don't believe the Congress should, if following the intent of the Constitution, usurp the property right of individual citizens.

Senator LONG. Let's see what your position means. Suppose a person patents something that could be put to use for national defense. Do you think that the Congress should pass a law that that person can have a patent to manufacture, produce, or to withhold that product from the market?

Mr. LENT. No, sir, I do not, and may I add, Senator, that you have available in laws today, all of the tools that you require to break that bottleneck. In the case of an emergency if some patent is holding you from completing the mission of protecting the welfare of the United States, you have the laws available to you at any time to so break that

bottleneck and infringe on that patent without one word. I don't think you need other laws to do so. You have them now.

Senator LONG. Well, the only point I want to make is that no one is preventing you, your company, or your association from doing all the research and development they wish with their own money, but if you want a Government contract it seems to me that the benefits of the research and development that you acheive should be available to the Government, that is, the public which the Government represents. Now, what is wrong with that?

Mr. LENT. You assume we are in business just to do research and development. The only reason that we have a private-enterprise system is to make a profit, and I get the feeling around here that that seems to be a nasty word.

Senator LONG. No. Let me say this to you, sir. I am so much in favor of private enterprise that I would like to see more people in it, which is one reason that I don't too much agree with this monopolistic position. I am in favor of private property. I would like to see more people own something. I am not in favor of requiring you to do any business with the Government. You are not doing any business with the Government, and insofar as I am concerned so mnch the better for you if you don't want to. But if the Government wants certain information and wants to pay someone to get it, why shouldn't it have the privilege to get it just as you pay to get your information?

Mr. LENT. But it can be presumed, can it not, that the Government is in need and also requires the creative endeavor of its inventive citizens?

Senator LONG. Why can't the Government pay you for patentable information if it wants to just as you pay your employees for patentable information? You are not required to do that and they are not required to work for you.

Mr. LENT. You are saying the right word when you say the Government pays you for something. However, I am pointing out to you that in most instances this is not true. The Government seems to assume in the contractual relationship with industry that for the life of this contract, and let's say that it is $100,000, they have bought all of your know-how, all of your brains, everything that you possess far before the Government ever stepped in and gave you a contract, and I say that you did not buy this.

Now, let's straighten out another thing. Let's differentiate between research and development. There is precious little basic research done in this United States with Government money. In fact I would assume that probably project for project there is more basic research done in industry than there is under Government sponsorship, and I am talking about true research, Senator; I am not talking about development.

Senator LONG. How much do you think the Government is spending on research today, just Government?

Mr. LENT. I don't know. When I was in the Air Force, and I was in Research and Development in the Pentagon, it was a minimal amount. It was—well, the whole research and development budget of the Air Force was $400 million, and of that in basic research, Senator, I would say that it would be probably 10 percent or 5 percent of that figure.

Now, you have to differentiate between development and research. Development is the development of an idea and a concept to finished hardware. Research is the basic investigation of scientific properties to be able to know what possible use you might make of them and there is precious little of it done in the United States.

For instance, we established the Advisory Group for Aeronautical Research and Development for one fundamental thing, and that was to exchange with the NATO countries our flight-test knowledge and techniques for their basic research on the chemistries of combustion. We didn't have basic research on combustion in this country. France and England were far ahead of us. So you must understand the difference between these two things, and you must figure that when you come to industry for a development contract you say give us a missile that will fly 5,000 miles and deliver so much firepower in a radius of 5 miles. The principles that will build this rocket are already developed. They are in the minds of men. Why did you go to that company in the first place? Because they had the unique knowledge and capability to be able to project these ideas and principles into finished hardware that would serve the use of this country. So you didn't buy their soul. You did not buy their knowledge. You only bought their ability to do a job that you needed done.

Senator LONG. Aren't you paying for that when you hire your employees to do research on a job you want done? You give them fringe benefits, which you mentioned. You also pay them a salary, I assume, and you also have some sort of incentive system to give them some sort of royalty or some share of the profits that might result from their finding a successful invention, but do you find anything immoral with them signing that kind of contract with you that they are going to work for you and try to invent something?

Mr. LENT. I do not, sir, because this is why I hired them.

Senator LONG. If you don't find it immoral for them to sign a contract of employment with you, why do you find it immoral for somebody to sign a contract of employment with the Government to try to find out for the Government what it wants to know?

Mr. LENT. I anticipated this question, Senator, and may I read to you exactly what I think the Government does in this case? I have talked to you about what we do for the employee. We give him security, we give him recognition and the fringe benefits and everything like this. Now, let's look at what the Government does. In contrast, we are not rewarded by the Government in steady contracts. Is this correct? No one says, "Mr. Lent, you are a good guy; you just keep on for the next 10 years and we are going to give you contracts." Nobody says that to me, do they?

As for rising prices for our product or regular advances in our prestige or our standing with the Government, the Government doesn't do that, does it? In other words, it doesn't give us an automatic raise in our pricing structure. They still try to beat us down with competitive procurement, do they not, to get it the cheapest, which is justifiable, and you should do it.

Senator LONG. How do you go about buying the commodities you need for your business?

Mr. LENT. We buy it the same way you do it.

Senator LONG. Do you buy it on a competitive basis?

Mr. LENT. We buy it in the same way, and we do not dispute the Government's competitive-bid practices.

Senator LONG. How does the incredible growth of the Aerojet Corp., a 40,000-fold increase, solely on Government contracts, fit in with your statements?

Mr. LENT. I am glad you asked that question because I happen to know something about Aerojet. It is a very dear and close friend of mine who was the founder of Aerojet. He founded it as a result of Gen. Hap Arnold calling him to the Pentagon along with a professor from New York University. He didn't ask Dr. Von Carmen to start Aerojet. He told him to. He said, "You are going to be assigned the job of the solid propellant to give jet assistance to our aircraft because we require it."

He then turned to the other chap, who was from New York University, and he said, "You are going to take over the liquid propellants of our war efforts." This is back in 1942. The result of that was the establishment of Aerojet and Reaction Motors.

Now, let's take a look at these two companies. Both of them started under the same principles. In other words, the general requesting that they contribute to their country in this dire need. Aerojet went on and had particular skills as far as being able to develop something into a producible item and so they developed the JATO in rather rapid fashion, and they had the JATO all during the war.

Reaction Motors, with a very creative, imaginative group of people, came up with some of the most advanced technology in the field of rocketry, but they did not have the manufacturing or productive acumen, and so as a result Reaction Motors today is perhaps a $20 million to $30 million operation, where Aerojet is the operation you see.

I maintain, Senator, the difference between these two companies is based on business acumen and not because of preferred position in the marketplace.

You had to get this someplace, did you not? Certainly you would not just go out to Joe Blow, who "knew from nothing" about rockets and say, "Please build us a rocket engine." I point out to you that you need these things. You need these industries. You can't kick them in the teeth now becanse they have produced and done it very successfully.

Mr. GORDON. Mr. Lent, Mr. Peirez this morning testified that when he takes a Government contract, both R. & D. and production, the background that you talk about, the know-how, is nothing he gives away free, but it is included in the price. Now, I would presume that this applies to practically all business people.

Mr. LENT. Well, permit me to say that I disagree with Mr. Peirez. I haven't found the yardstick yet, Mr. Gordon, that can measure that creative ability in an individual, and if Mr. Peirez has found the formula I think that is grand.

Mr. GORDON. Mr. Lent, I have another question. Your statement and other statements you have recently made—I read the one you made before the NASA hearing and also before the American Rocket Society—have indicated an extreme concern on your part for the future safety of our country; is that correct?

Mr. LENT. Very definitely.

Mr. GORDON. Very definitely. Does your company have any R. & D. contracts with the Government? You stated not. You also stated that you would not take any Government contracts. Apparently, then, your concern was not great enough to mitigate the alleged disadvantages of Government contracts; is that correct?

Mr. LENT. May I clarify? Are you suggesting a lack of patriotism; is that it?

Mr. GORDON. No; I am not.

Mr. LENT. I would think, Mr. Gordon, in my evaluation of our wonderful country, that I would be far more unpatriotic to be stupid enough to go broke, which might happen if I took a contrast which was not to the best interest of my company and my stockholders. In other words, you have the situation in which it is becoming sheer economic stupidity to take some of these contracts and not to take them becomes treason, almost figuratively, treason. So you put us in the untenable position of either give it all back to the Government or stand back and divert your R. & D. dollars to commercial products where you will receive this protection which is fundamental to free enterprise.

Mr. GORDON. What precisely are you driving at? Are you saying that you want a sole-source position? If you develop something, let's say, at Government expense, do you feel that you should also get the production contract of that particular item that you developed?

Mr. LENT. Let's answer it this way: If I am competitive, if I give the Goverment a fair dollar's worth for the dollar that they expend, and if I meet their delivery requirements and their programing requirements, the answer is an inalterable "Yes".

Mr. GORDON. What do you mean competitive?

Mr. LENT. In other words, my price. The Goverment is not incapable of evaluating the cost of a particular item. If my item can be procured by the Government at a price which the Government considers fair and just, and if it meets all of their requirements, the answer is "Yes". If it does not, if I fall down in some way, then the next step the Government should take is to come to me and say, "We would like a second source. Please license another organization." If you refuse to do that, and I won't license them, I won't do this, I won't do that, then the Government, I think, is perfectly justified in coming with some sort of legal action such as eminent domain to take the item away from me and place it in the hands of people who will produce it to meet the national emergency. But, you see I clearly differentiate between usurpation and legal process of law.

I can't understand it myself. You see, I think you are laboring under the illusion, Mr. Gordon, that everything that is an item that the Government buys is paid for by the Government, and this is not true. This is not true. You haven't bought every valve, every transducer, every temperature probe. A tremendous amount of money has been spent by industry, and I remind you, or you should know, that is to your advantage that this be done. What private industry does is to attempt to analyze and attempt to evaluate the requirements of the military at a certain time in space, and then they start their research and development programs in order to intercept

those specific military requirements. Now, if they have spent their money and have taken the risk to do this, then I think they should be rewarded with giving them the production for such type of products.

Mr. ANSBERRY. Mr. Lent, do I understand you are opposed to the present Department of Defense patent clauses?

Mr. LENT. The patent clauses of the Department of Defense, as contained in ASPR 9, section 1, we are not opposed to it as a working solution. We have learned to live with it; let's put it that way. Basically I still believe that it is not the proper principle; that it is not a thoroughly just clause. but I do believe it is workable, and I think that most industry would be willing to accept the type of terminology contained in the ASPR regulation.

Mr. ANSBERRY. I suppose you have listened to the discussion we have had here today on what we have loosely referred to as the British Government system? How would you feel about that system?

Mr. LENT. I am completely unfamiliar with it, and I don't feel at all qualified to reply.

Mr. ANSBERRY. Let's say that in effect this system as we understand it makes the Government a partner in the patents that it develops on a research program for which it pays the principal cost; the returns on the British Viscount, we understand, covers the cost of the research on the Viscount.

Mr. LENT. Permit me to state it in my words; that if Government subsidized the development of this particular device from cradle to grave, in other words, from concept to finished product, and then the organization that developed it would retain title to the patent, but they would pay royalty to the Government.

Mr. ANSBERRY. That is right.

Mr. LENT. I would say that it might be a reasonable system, providing that industry had a chance to look at it very thoroughly and to testify on the merits of it.

Senator LONG. You stated to us, and I believe these were your words, "Patent and monopoly have no relationship." I am just a fellow who majored in economics in college and that doesn't sound right. I notice here in Webster's dictionary, the Collegiate Dictionary, on the definition of patent of the type we are talking about:

> A writing securing to an inventor for a term of years, exclusive right to make, use, and vend his invention; also the monopoly or right so granted, or the thing patented.

It is monopoly by definition.

Now, your explanation is that there is no relationship, if I understand it. You are confused, aren't you?

Mr. LENT. No, I am not confused. Mr. Chairman, let me point out to you I am not a lawyer. However, I do have enough interest to read and in the particular situation I have taken the trouble to read where the patent grant developed; why did it develop; and if you will look back you will find that it developed as a result of the Ipswich Cloth Workers Case in England. Specifically the "statute of monopolies" developed from this case in English law, which was subsequently handed down through our system of government. However the court very clearly distinguished between a monopoly and a patent, or the right of an individual to protection from other people

on his discoveries and his inventions. I agree that if an individual has an exclusive right to sell his product and no one else can develop that prdouct on threat of suit, perhaps, semantically you can use the term monopoly, but it does not mean monopoly in the sense of the word that it is a dreaded or distasteful thing.

Senator LONG. When you say patent and monopoly have no relationship I hope you get Webster straightened out the next time he revises his dictionary and get my old economics professor straightened too, because apparently people have been confused for a long time about this matter.

I hope you did consult with some lawyers when you came up with this phrase:

> These men for whom I speak have suffered the consequences of patent clauses in usurpation of their constitutional patent privilege.

I practiced law for a while myself and made a study of some phases of patent law. It is my impression that you don't have any constitutional patent rights. The Constitution gives Congress the power to confer it on you, and you have statutory patent rights. It is an act of Congress, and if the bill were up now I would be pleased to vote for the patent law to give a patent monopoly under certain conditions. I think it should be qualified in the public interest, so as to promote the national interest. Your attitude that we are forced to give any particular right is untenable. What the founders of the Constitution had in mind was that the kind of law we ought to pass should all depend on the circumstances and of course should be in the national interest.

Mr. LENT. You see, as a nonlawyer, that I have taken liberty in my words. Perhaps if I had used the phrase "violation of the constitutional intent" that may have satisfied you, but the fact remains, Senator, that we were not speaking loosely; that it is there in black and white, and it is just as valid today as it was the day it was written, and that you cannot expect the private industry inventor, the creative soul, to come forward with his ideas if he is going to get kicked in the face when he does. I remind you that the Government puts out a paper that ask you to come forward with your ideas and inventions to help the Government solve their problems, and so if you do come forth then you give it away.

Mr. GORDON. Were you an Air Force contracting officer?

Mr. LENT. No, sir, I was not.

Mr. GORDON. What was your capacity?

Mr. LENT. I was a pilot, and then I was an administrator for about 6 years of civilian personnel in different sections of the world, and my last 4 years of Air Force assignment I was executive to the Deputy Chief of Staff, Development, of the Air Force.

Senator LONG. Who was that at the time?

Mr. LENT. First, Maj. Gen. Gordon Seville; second, Lt. Gen. Donald Putnan; and, third, Lt. Gen. William Cragey.

Senator LONG. Was that a procurement position?

Mr. LENT. No, it was not. It was strictly a research and development administrative post.

Senator LONG. Did you have any responsibility for negotiation of research and development contracts?

Mr. LENT. I never have, sir.

Senator LONG. Thank you very much, Mr. Lent. Your prepared statement will be included at this point.

PREPARED STATEMENT OF ROBERT R. LENT, STRATEGIC INDUSTRIES ASSOCIATION, LOS ANGELES, CALIF.

Mr. Chairman, I deeply appreciate this opportunity to appear before your Monopoly Subcommittee today as spokesman for the Strategic Industries Association, an organization of more than 100 small and medium-size independent companies in Southern California whose major efforts lie in the national defense field. It is my earnest desire in meeting with you today to demonstrate to you that beyond any question our Federal patent policies, far from aiding "big business" through their liberality, actually most seriously impair our rate of scientific and technological progress in the missile, weapon systems, and space exploration fields through their tight repression on creativity. All business, big and small, today suffers most drastic compromise to its creative productivity through virtual elimination of incentive for progress engendered by the recent rapid erosion of our constitutional patent privilege.

I am confident that you have studied the patent laws, the policies and the working practices of the Department of Defense, the Atomic Energy Commission, and the National Aeronautics and Space Administration—the three agencies responsible for our progress in weapons technology—and, therefore, I need not belabor the confiscatory effects of these practices on the creative efforts of scientists and engineers upon whom our national survival depends. I do not exaggerate when I summarize Federal patent policy in this field as one which says: "We will take from you the fruits of your labors, while we beg you to increase them with all your energies." This approach to our own scientific community borders perilously close to those of foreign ideologies with which we are locked in uncompromising conflict.

I speak to you today not as a patent attorney, nor even as an authority on either Federal or corporate patent practices and procedures; rather my authority and qualifications as an expert stem from experience in the practical, real effects of present Government patent practices in the defense field on the profits, the incentives and the economic frustrations of fiercely-competitive, independent businessmen—the true sinew of our national economy. I submit, Mr. Chairman, that these are the real experts in this field. These men, for whom I speak today, have suffered the consequences of present patent practices in usurpation of their constitutional patent privilege, in the award of procurement contracts for their proprietary inventions to their competitors, in renegotation of their profits away from them, in disallowance of direct costs chargeable nowhere else, and in ultimate complete frustration of their creativity and even desire to be of further direct service to their Government.

Today, the tangible results of this confiscatory Federal patent policy is manifiest in the flat refusal of many of my principals, together with hundreds of similar small business firms in the defense field across the Nation, to accept Government research and development assigments. Let us see how this is so, and examine its consequences to the national defense and the space effort.

Never before in our scientific history has the challenge been so great for the invention of new devices, the discovery of new principles and the development of new technical ideas. Today we are asked by these three Government agencies to generate forces, temperatures, and stresses utterly beyond the ken of even basic research only a decade ago. The demand on our engineers to perfect new materials, devise new electronic circuitry and develop new mechanisms is not only enormous but grows in intensity with each headline signalling another Russian achievement, which, unfortunately, is frequently paralleled by another American failure. Certainly this should be the "golden age" for the technically sophisticated with literally unlimited opportunities for reward through effort. Tragically, this is not a "golden age" for science because the traditional rewards for creative effort in this land of opportunity have been eroded away through Government usurpation of the patent privilege.

One of the companies with which I am associated typifies not only the membership of our association but many hundreds of like firms across the Nation. It was founded in the immediate postwar years on the basis of a patented device which measures force, pressure, or acceleration in a simple, accurate way under severe environmental conditions. The company was a success from the outset and today employs nearly 1,000 people in five different plants to produce $10-

12 million a year sales volume in this patented device. Today it enjoys first rank in its particular proprietary field.

To the uninitated, this portends monopoly with associated fat profits and security against competitive inroads on its market through its patent protection. Nothing could be further from the truth and such thinking discounts the facts of business mechanics in technical fields. This company produces a patented device making use of a particular scientific principle. But there exists 12 other scientific principles through the use of which the same job is being performed. This means that 12–15 other companies compete for sales in this market, each producing patented, proprietary products. Obviously, the competition in this specialized field is between scientific principles and not merely patented gadgets. Thus, quite the reverse of lay opinion, this company's patented proprietary rights not only do not create a monopoly of its market but barely give it sufficient support for survival in a highly competitive field. There simply cannot exist a single, vastly-superior idea in the scientific field which corners a whole market.

Now each of the 12 scientific principles utilized in the design and production of these measuring instruments, which are absolutely vital to the progress of our national defense and space exploration efforts, has highly-specialized, narrow advantages in one or two qualities over the full range of perhaps a dozen qualities demanded in a scientific instrument. Thus, this company is in a competition of scientific principles, rather than of price, warranty, delivery, or field service of a particular company—the competition familiar in such nondefense fields as home appliances, automobiles, or television sets.

This means that in the missile and space vehicle field there simply cannot exist monopoly-through-patent in the classic sense, insofar as scientfic principles available in any textbook are not patentable. Here, I submit, is the core of the lay misunderstanding of monopoly and proprietary rights in inventions in the defense field.

The second factor militating against capture of a technical market by a single supplier is the generally accepted fact that each scientific principle has its own natural limitations. This means, for example, that the familiar mercury thermometer used in nearly every home in America is useless for measuring temperatures of rocket engines, that the principles of the piston engine familiar to every schoolboy are inapplicable to the propulsion of bombers or transports at sonic speed and that the heterodyne radio receiver, repairable by millions of Americans in their own home, is useless for the guidance, control, or communications of missiles or satellites.

Thus, our companies must develop entirely new scientific principles if they are to extend the range of their instrument capacities, electronic equipments and mechanical devices into the regions demanded for future weapons and space vehicles. Obviously, this requires patient, costly exploration of advanced scientific research fields supported by laboratory experiment. Our companies and hundreds of others like them, are brought to a critical impasse: if the Government pays for such investigations, the resulting products and manufacturing rights thereto become the property of the Government. If private enterprise pays for this investigation, the rights to the inventions must be transferred to the Government with the sale of the device to one of its prime weapons system contractors. Obviously, Mr. Chairman, this is the familiar "heads they win, tails we lose" dilemma for the small businessman.

The inevitable decision of the practical businessman, whose sole incentive is profit, is to simply reject such programs and invest his company's money in continuous, incremental improvements in his existing products—with resulting sacrifice to the rate of scientific progress of which he is fully capable.

This situation extends impartially across the small, medium-size, and big business echelons of our economy. Big and small business in the weapon systems field are inextricably intertwined and inseparable, each relying on the other for major support. We most seriously question that legislation can be devised which restricts one while relieving the other, since both big and small business will be affected equally by the provisions of new legislation in this field, directly or indirectly.

Today's intercontinental ballistic missile delivered to the Air Force by a huge prime contractor is made up of literally hundreds of individual proprietary products conceived and produced by small business and assembled by the prime contractor into a complete weapon. The prime contractor himself had to compete hard and expensively against other giants in order to win his contract and his

basic design of the weapon contains many features on which he has rightfully claimed patent.

Both small and big business, therefore, hold the Government in fundamental error in its concept that the complete weapon and all its component parts are the property of the Government with legal right to place their production among any of the thousands of available competitive bidders, most of them without laboratory facilities or even engineering departments. It is not the concept of the competitive bid that is harmful to proprietary rights—our association endorses it fully—but the concept that the inventor of the device to be procured under competitive bidding has no right to the success of his idea and enjoys no benefits from his labors in its creation.

The heart of the conflict lies in the scope of applicability of the device contained within the missile. The small business man enters into development of a new device responding to a specific need solely in the hopes of expansion of that need into a general one. The Air Force knows full well its difficulties in placing a development contract for an unique device applicable only to a single, specific missile or space experiment under competitive bidding. In these cases—and they are numerous—it must negotiate an incentive contract with an individual company or develop the device in a Government laboratory. Far from criticizing this method as unfair, my own association fully endorses this approach, since there exists no remote profit opportunity for the general marketing of the device. We have no quarrel with the Government's retention of manufacturing rights to such single-application critical components. It is the inclusion in a weapon system of a device having wide application in many fields, the marketing of which is denied through Government patent right confiscation, that creates the legal, economic, and moral injustice.

For example, many engineers believe that the near future will provide each automobile with a simple, inexpensive indicator on the dash which displays with great accuracy the precise amount of fuel in the tank and expresses this in terms of the number of miles of travel available before the tank runs dry. Frankly, I would like to have one of these in my car right now, since I frequently drive around with the needle pointing on "E" and the conviction that I still have enough gas left to get where I'm going. Such a device would enjoy a multi-million dollar market but—unfortunately—the principles and techniques required for its development must be drawn from those already used in minature airborne computers presently furnished the Government and the rights to which belong to the Government. Should I have such a device in my own basement workshop, I would vigorously refuse its sale to a missile contractor or directly to the Government, thereby robbing our defense effort of another step forward in our national technological battle.

Conversely, should the Government recognize my constitutional patent rights in my own invention and purchase the computer from me simply as a customer on terms and conditions acceptable to us both, under which arrangements I would still be secure in my rights to market the device to the automobile industry, I would most enthusiastically make such computer available to the Government and bend every effort to further improve the device for each specific Government application.

Thus, in essence, my association believes that existing Federal patent policies and regulations are most greviously obstructing the pace of this Nation's weapon systems and space exploration efforts, are clearly in violation of the content and the intent of Articles 1, Section 8 of the Constitution, and are literally creating and aggrevating the conditions they are designed to alleviate. They are not saving the Government money, since they force the Government to sponsor development programs at great cost that private industry would happily sponsor if guaranteed normal patent rights in the products thereby produced. They are not availing to the Government the best brains and talents of the Nation, which are distributed as liberally throughout small business as in big business, because these talents cannot be called forth without adequate incentive. Lastly, and most seriously in the policy sense, present Federal patent policies have no foundation in purpose or reason: they place the U.S. Government in the position of owning vast quantities of patents for which it has no conceivable internal use, since it does not manufacture, market, nor otherwise make direct contribution to the American economy. The practice must inevitably produce the spectacle of the Government suing one of its citizens for infringement of a patent owned by all the people—and therefore of no competitive value to anyone—it implies ultimate licensing of the manufacture of commercial products in the marketplace at a profit to the Government,

and it must eventally create another giant bureaucracy for the administration of the Government's participation in the heretofore private enterprise of the Nation. We submit, Mr. Chairman, that none of these things constitutes a proper role of Government in our society.

On behalf of the Strategic Industries Association, I urge upon this subcommittee the preparation of legislation which simply reaffirms the right of the citizen to exclusive reward for his inventions and discoveries for a limited time, other Federal laws, regulations, or administrative practices to the contrary notwithstanding. Only such a simple, forthright re-declaration can salvage the constitutional guarantees now almost lost and return to the inventive citizen, so sorely needed in today's scientific battle, the rights granted him by his Founding Fathers.

I thank you.

We will meet at 9 o'clock tomorrow morning. I had not planned to go beyound 5 this evening. At that time we will hear the Lockheed witness.

(Whereupon, at 5 p.m., the subcommittee recessed until 9 a.m., Wednesday, December 9, 1959.)

PATENT POLICIES OF DEPARTMENTS AND AGENCIES OF THE FEDERAL GOVERNMENT

WEDNESDAY, DECEMBER 9, 1959

U.S. SENATE
SUBCOMMITTEE ON MONOPOLY
OF THE SELECT COMMITTEE ON SMALL BUSINESS
Washington, D. C.

The subcommittee met, pursuant to recess, at 9:00 o'clock, a.m., in Room 457, Old Senate Office Building, Senator Russell B. Long, presiding.

Present: Senator Long (presiding).

Also Present: Walter B. Stults, staff director; Benjamin Gordon, economist; T. Peter Ansberry, counsel; Hamilton Richardson, legislative assistant to Senator Long.

Senator LONG. We will come to order.

We are pleased to have you here today. We are interested in knowing what information you can give us about the three nations interested in buying jet aircraft made by your company, and what your position is with regard to that.

We have your statement here, and I suggest you summarize it before I ask you questions.

STATEMENT OF BURT C. MONESMITH, VICE PRESIDENT, LOCKHEED AIRCRAFT CORP., GENERAL MANAGER, CALIFORNIA DIVISION, BURBANK, CALIF.; ACCOMPANIED BY L. V. KERBER, CORPORATE CONTRACT OFFICER; AND CHARLES D. WOODRUFF, LEGAL STAFF

Mr. MONESMITH. I think I can summarize it.

Mr. Chairman and members of the subcommittee, my name is Burt C. Monesmith. I am a vice president of Lockheed Aircraft Corp. and general manager of its California division with headquarters in Burbank, Calif. Our company, as you undoubtedly know, has been engaged in production of commercial airplanes since 1932 and military airplanes since 1938.

In my official capacity I have had direct and personal knowledge of our contracts with the U.S. Air Force covering the design, development, and production of the F–104 Starfighter—dating back to 1952. And I actually participated in a great many of the negotiations and agreements with the Federal Republic of Germany during 1958 and 1959 covering its purchase of an all-weather fighter based upon the Starfighter concept.

I believe that therefore I have first-hand knowledge of the matters of concern to you in your present investigation. To provide additional detail or clarification, I have brought with me today Mr. L. V. Kerber, our corporate contract officer, and Mr. Charles D. Woodruff, a member of our legal staff. In the event you need still more material, I can assure you that we will obtain or prepare it for you and furnish it promply.

It is our understanding that you are seeking information germane to the question of whether in the financial relationships and results of Lockheed's contracts with West Germany the interests of the U.S. Government are being properly served. I most certainly can assure you that we are in full sympathy with the objective of your current inquiry.

And I can tell you sincerely that we believe our agreements with the German Federal Republic are serving the best interests of the U.S. Government and people.

We believe they are in line with America's enlightened policy of cooperation with friendly foreign governments. They conform to our Government's defense goals of improving the ability of these friendly Governments to share the burden of global defense. They are contributing to the advance of American technology and lowering the cost of complete military systems to our own armed forces. They are generating tax revenues and improving the American balance of trade. And they are aiding the American economy by providing upward of $200 million to provide some 5,000 jobs in the United States—spread among our own company and more than 600 other American companies scattered throughout most of the United States that are partners with us in producing this new German plane.

I can summarize the history of the F–104 Starfighter very quickly. Our own design studies began in 1950, and we made our formal proposals to the Air Force at about the same time that the appearance of the Russian jet MIG's in the skies over Korea showed the need for a new American fighter with far greater performance than any our Nation had available at the time. Further design studies and negotiations culminated in March 1953, with the receipt of an official go-ahead from the Air Force to develop and flight-test two experimental prototype F-104's.

Contracts with the Air Force, originally calling for 724 planes with a value of more than half a billion dollars, were reduced later by cutbacks and terminations. Ultimately the U.S. Air Force contracts produced a net total of 296 airplanes in 4 different configurations. The total value, including spares and related equipment, is approximately $360 million.

Three years ago when the German Ministry of Defense began looking for a fighter airplane to fulfill its role in the mutual defense efforts of the western nations, it closely examined more than a dozen aircraft from the United States, Great Britain, and France. It conducted an unprecedented 2-year evaluation of several of these, including one French, one British, and at least one other American plane besides the F–104. Teams of German pilots and technical and manufacturing personnel visited our plants before selecting the F–104 type for their principal fighter aircraft.

Starting in December 1958, we began discussing the configuration and contractual matters with a German technical team. I want to stress that in these negotiations Lockheed followed the requirements of the U.S. State Department regarding licensing of implements of war to foreign governments. Beginning in December 1958, we submitted to the State Department copies of major drafts of the license agreement. We similarly kept the Department of Defense informed of the status of these negotiations. And final agreement was furnished to and approved by the State Department—after consultation with the Department of Defense—in March 1959.

The first of our two contracts with the Federal Republic of Germany provides that Lockheed will do two things. First, it will perform research and development and flight test for Germany of a new aircraft designated as the model 683–04–07. For convenient reference this new model aircraft being developed under the German contract is identified as the F–104G. But it will be substantially different from the F–104 models delivered to the U.S. Air Force. The U.S. model was a day superiority fighter. The German is an all-weather fighter with fighter-bomber capabilities. Development of this new single-seat airplane will require the expenditure of some $35 million by the Germans. This $35 million expenditure may be compared with the total development cost of $54.5 million paid to us by the U.S. Air Force on its single-seat F–104 models.

I should like to stress the fact that all of the $35 million development cost will be paid by the German Government. Our German contract provides that the U.S. Government will not in any event be required to pay any portion of this development cost.

Second, this contract with West Germany provides that Lockheed will manufacture in the United States and deliver to the German Government a substantial number of complete airplanes of this new type.

In its license agreement with the German Government, Lockheed grants it the right to manufacture this new model airplane in Germany. Lockheed also agreed to furnish technical data, manufacturing information or "know-how", and technical assistance necessary to enable the Germans to manufacture such aircraft. Lockheed did not sell the data or information as such but rather granted the Germans the right to use such information for a limited period of time. Upon completion of the license term on June 30, 1966, the German Government must return to Lockheed all of the data furnished to it.

More specifically, Lockheed did not sell to the Germans, nor was any charge made to them for:

1. Technical data in the possession of the U.S. Government or in which the U.S. Government has a right to possession and regarding which there is no prohibition against use by the U.S. Government and disclosure to others (other than reasonable charges for reproduction, handling and mailing, and other similar administrative costs).

2. Royalties or amortization for patents or inventions in which the U.S. Government holds a royalty-free license.

Our license agreement specifically provides that there is no charge for such information. And in addition it specifically provides that all rights transferred by Lockheed to the Germans are "subject to existing rights of the U.S. Government."

An initial fee and royalty payments provided in the license agreement are reimbursement to Lockheed for these following materials and services:

1. The furnishing by Lockheed, and the right of Germany to use, only technical data:
   (a) to which the U.S. Government has no possession or right to possession;
   (b) to which the U.S. Government has no right to use or disclose to others for use;
   (c) to which the U.S. Government has no royalty-free license; and
   (d) which is not in the public domain.
2. Within the framework of item (1) above, the right of Germany to use manufacturing techniques, procedures, and methods developed by Lockheed over many years of experience in the design and manufacture of aircraft.
3. The furnishing by Lockheed to Germany of general management advice and information relating to the manufacture of a complex, high performance aircraft.
4. The right to use Lockheed's trade names, trademarks, and other proprietary designations.
5. Certain warranties by Lockheed relating to the F–104G.
6. Patent indemnity to Germany for infringement of German patents in an amount up to $1 million.
7. The furnishing by Lockheed to Germany of assistance in obtaining materials from third parties.
8. The right to use certain Lockheed inventions in which the U.S. Government has no interest.
9. The furnishing by Lockheed to Germany of certain technical assistance.
10 Physical reproduction of the technical data.
11. Furnishing by Lockheed of office space, equipment, and services for the German representatives in Burbank.

In addition Lockheed undertook to give factory training to unlimited numbers of German personnel for another fee.

Lockheed has not granted any licenses relating to the F–104 to any German firm or corporation. We have two agreements with an organization known as ARGE–104, which represents the four German firms selected by the German Ministry of Defense to manufacture the F–104G. These contracts cover the purchase by ARGE on a regular commercial basis of tools, "knock-down" airplane kits, parts, and other equipment that may be required by the manufacturers in the initial phases of their program.

By a separate government-to-government transaction, the Federal Republic of Germany has purchased from the U.S. Government, with German funds, a quantity of U.S. Air Force F–104F two-place trainers. We are manufacturing these airplanes in the United States and delivering them to the U.S. Air Force, and in turn the United States is transferring them to the German Government. We have not contracted with Germany to grant it any rights in connection with this F–104F airplane.

I would like to emphasize that the technical assistance, knowledge, and data for which Lockheed is to receive payment from the Germans,

do not include any for which the U.S. Government has paid or to which it has a right to possession or use.

Our F–104 contracts with the U.S. Air Force all contain standard "patent rights" clauses which grant to the Government an irrevocable and royalty-free license for use throughout the world of inventions, improvements, and discoveries conceived or first reduced to practice under or in anticipation of the Air Force contracts. These clauses do, however, leave title to such inventions in the contractor. Thus the Government has the rights arising out of performance of the contracts which it needs. The contractor remains in a position to use its inventions and developments commercially.

The great importance to the public interest of the safeguarding of contractors' proprietary rights, we believe, has been clearly and strongly established. Moreover, in the manufacture of an airplane, large masses of data and information—documents used by the manufacturer and not required by the U.S. Government—are necessary to facilitate manufacture of the article. One set of this kind of data that we shall supply to Germany will consist of thousands of pieces.

The new airplane that Lockheed is developing at German expense has capabilities that are broader and in advance of those of the airplanes sold to the U.S. Government under contracts we have now completed. The technological improvements being incorporated in this model now become available to our own Government. And they are available to our own Government without payment of development cost.

The Air Force, too, already is benefitting from the German participation in this program. It is paying less for its F–104 spares because of continued production at Lockheed of many items common to both planes. Its costs of terminating the final F–104 production contracts were reduced by about $2.5 million by diversion of terminated materials from Air Force contracts to Lockheed production of the new German plane. And the German orders have helped to keep together the teams of skilled engineers, craftsmen, and administrators, within our own company and hundreds of other organizations who are thus ready at any time to swing into the development or production of new weapons for the U.S. Government.

Advantages to our Government in other ways include upward of $10 million Federal taxes that our company and other firms will pay as the result of the German program—$200 million worth of business to American industry that will improve our balance of trade. Our surveys show that the 632 companies having a share in the German F–104G program are located in 27 States—15 of them east of the Mississippi. More than 400 of them are small businesses with fewer than 500 employees. And the remainder of the larger companies, of course, spread their work among many more smaller organizations.

But perhaps even more important is the way in which this NATO partnership is bolstering our stand against the danger of aggression from the East. These planes strengthen German participation in the NATO alliance, reduce the cost of American mutual defense aid programs, and lessen the burden upon our own Armed Forces—and American taxpayers.

In summary, gentlemen, I want to point out that Lockheed and other companies in our industry have been working for many years

under State and Defense Department policies covering the foreign licensing of U.S. military products.

The ground rules are well understood by the Department of Defense, the State Department, other U.S. Government agencies, by the foreign governments, and by private industry. We believe they are fair to all parties in this country and abroad. We believe they serve the best interest of the U.S. Government and protect the legitimate and proprietary rights of private companies. We would like to see them continued and believe that no major changes are needed.

Now, I know that my statement necessarily has been somewhat general and perhaps far less detailed than you may wish. With the help of Mr. Kerber and Mr. Woodruff, I will do my best to answer any questions you may have.

Senator LONG. Mr. Monesmith, I want to get this straight for the record. How much is your company being paid for the services it is furnishing to the German Government in connection with this aircraft, the 104G?

Mr. MONESMITH. For technical data and assistance, it is being paid a fee of $750,000. This includes a list of many items. I mean——

Senator LONG. Yes. I see on page 4 of your statement here:

> I should like to stress the fact that all of the $35,000,000 development costs will be paid by the German Government.

To whom?

Mr. MONESMITH. Well, it will be paid to us for work to be done, but about half of it goes to equipment supplies for development of equipment items, and they come from all over the country, and most of this development is items that can be used in any other airplane once they are developed, but they are specifically being developed for the German, such as items like, well, for example, a new fire-control system.

Senator LONG. Yes.

Mr. MONESMITH. And the inertial navigator is a new inertial navigator, and there are a dozen large electronic components that are being developed by firms, some small, some large—the North American Corp. has been asked; Minneapolis Honeywell has certain of the flight controls and the auto pilot; Litton has the inertial navigator; there are dozens of small companies that build IFF equipment, and such things like that.

Senator LONG. Is that to be paid to them for tangible items that they produce or is to be paid for the drawings and specifications and patent rights?

Mr. MONESMITH. Well, the $35,000,000 is paid, some of it is paid, to us for labor and material that we produce.

We have to flight-test this thing, and we do some development on the airplane over the Air Force version, because there is a considerable difference in the airplane.

The money that is expended to the vendors or subcontractors or equipment suppliers in this case is for the development of a later version or a new version of an article that they have experience in, and also produces a certain amount of hardware for test aircraft.

Senator LONG. That is the point I had in mind. I am curious to know how much of this $35,000,000 goes for tangible items that are

being produced, and how much of it goes for research and development and know-how so that the Germans can build a plane for themselves.

Mr. MONESMITH. First, I should clarify the fact that we can not license these articles that are proprietary to these vendors.

If there is a license with the German Government, they have to make a direct license agreement with the company that builds this article and has proprietary rights.

In our licensing agreement with Germany we can only license those things that are Lockheed's and, therefore, they are making some license agreement, and probably will some day have all of the things licensed.

But those are separate negotiations with each company that produces a part of this airplane, and there will probably be more license agreements with these companies than the single one that we have, by many fold.

But to directly answer your question, of the $35,000,000 I would say that a rather small part of it is in the research side, but the development side, where you have to build mechanical articles or electronic gadgets, is the major portion of it.

True, in the building of this, there are errors found, and we have to do it over again, but that is all part of the development problem. Design costs and things like that, of course, are involved.

Senator LONG. Yes.

What I am trying to find out is how much of this $35,000,000 is being paid to Lockheed for know-how and for——

Mr. MONESMITH. None.

Senator LONG. And for patents, and for technical skill that your company has.

Mr. MONESMITH None of the $35,000,000. That is strictly work to be done and expended for articles that they get.

Senator LONG. In addition to this, is there a payment for——

Mr. MONESMITH. Yes,sir. There is the $750,000, plus another fee of $250,000 which takes into consideration that we must train a lot of German people, manufacturers' people, to show them how to do the thing in this country.

That is not all just money we can put in our pockets and all profit, because we have to give service for that. But there is a percentage of that that we collect that is for our know-how.

Mr. WOODRUFF. Senator, on page 5 begins a list of the things for which the $750,000 is paid to us. (See p. 159.)

Senator LONG. In addition to the items that you mentioned here, is the U.S. Government getting any cash consideration for the research and development that they paid for on this airplane?

Mr. MONESMITH. Not as far as the new German version is concerned.

As far as the F–104F, we do not know exactly what they charge the Germans for it, but we assume there is a fee in it for handling and whatever they wanted.

You see, they brought 30 of the Air Force versions right off our line, but not directly with us, and we did not license that airplane. We let them handle that right through the Government.

The only license we gave was on the new airplane, which is different from the Air Force plane.

Mr. KERBER. They got the 30 to train on and when they get there ——

Mr. MONESMITH. The 30 are two-place, sir. They act as trainers, wherein the fighter is a new version, and aerodynamically it is the same, but physically it is different.

Senator LONG. Can you give me this information: How much did the U.S. Government pay as development costs on this plane, on the F–104?

Mr. MONESMITH. Well, let me qualify it this way: The original development contract was for developing the model in two aircraft, plus about a year's flight test of the two aircraft, and that amounted in the early days, the total of that was $13,000,000, of which what you would call research and development was about $8,000,000 of it because the rest was hardware.

Now, there were 4 versions of this airplane built for the U.S. Government, and if you add up all 4 versions, plus the 2 prototypes, then the total amount of that, which is research and development, of which most of it is development, because hardware, they got 52 airplanes, for example, in the test program, it amounted to roughly $54,000,000.

Now, this research and development is primarily a definition of how we spend certain kinds of labor within our company, and it is a definition that is not a unilateral definition.

The U.S. Air Force says this is what research and development consists of on this kind of a contract, you see.

Senator LONG. To your knowledge, is the German Government paying the U.S. Government anything to help defray our $54,000,000 that we spent in developing this airplane?

Mr. MONESMITH. To the best of my knowledge the answer to that, is no.

Mr. WOODRUFF. Wouldn't you say that presumably in the 30 airplanes there is an increment for development?

Mr. KERBER. It depends on whether that is their policy.

Mr. WOODRUFF. Depending on how they have been priced.

Mr. MONESMITH. In the case of our allies, the NATO countries, and the SEATO countries, it has not been the policy of our country to influence them on what kind of airplane they ought to buy, and after they decide, if it happens to be an American airplane, and in this case real tough competition was the French Mirage III, which was an airplane that had not been developed, and the French were anxious to have the Germans develop it, and they made a real fine business deal, but we were lucky enough to win out on the technical side with the airplane.

And, as a result of this attitude, when the Germans finally make a decision, whether it is our airplane or anybody else's in the United States, they have not asked them to go back and recover, to my knowledge, any development costs on the models that have gone before, but they have also stated that they will not pay anything on the future development of the model either.

But they give the NATO countries the benefit of anything they have got their hardware for.

This might be different if they were helping the U.S. Air Force develope this, but, you see, in this case the Air Force had already developed this, paid for it, and gotten the articles, and it was not a joint program with the Germans. It came afterwards.

So, to answer your question, I do not believe that they went back and recovered, to the best of my knowledge, except there may have been something on this F–104F.

Senator LONG. When this foreign aid business is discussed, some people are waking up to the fact that this country is running out of gold, and there is some question as to whether we can continue just to give everything without asking for something in return at the Government level. Would it seem to you that this Nation could, if it wanted to, in such negotiations, insist upon and receive a substantial payment for those research and development and patent rights that we paid for in cases like this where we paid $54,000,000 for it?

Mr. KERBER. I would like to clear up one impression you may have. All of the $54.5 million on the prior 104 is not applicable to this new airplane; probably a small part of it is stuff that is common to both.

So far as your other question is concerned——

Senator LONG. Let me get this straight. Could you build the 104G that you are discussing if you did not have all the backup information and the technical data that went into the building of the 104 initially?

Mr. KERBER. We would have had to spend more than $35,000,000 in development, but not the sum of the two.

Mr. MONESMITH. The answer is we could have built it, but the fact that we already had some background knowledge produced a cheaper airplane.

You see, one of the big problems so far we have tried to sell those countries that have got their own money to buy this rather than to come through the Government to buy the airplane, and while we—and the Germans, of course, were the first ones to do this, and so far the Canadians are the first, and while there are other countries that said they would want to, we have not got any contracts with them yet.

In this particular instance it is quite competitive, sir.

The British are real tough when it comes to negotiating, and the French are good, too; and in many cases they will take development costs on the government side and absorb development costs, just to sell the airplane in the country, where we do not particularly have anybody helping us do that in the United States.

Senator LONG. I saw an article where the British feel that they have recouped their expenditures on the Vickers Viscount by receiving one-third of the license and patent fees that the corporation has received as a result of their development of that plane.

Mr. MONESMITH. I would like to comment on that because we are in direct competition with the Viscount in the world, with an airplane known as the Electra. It is a little larger, but it fits in with those airplanes. In the case of the Government, that is a commercial airplane, sir.

Senator LONG. That is a good plane.

Mr. MONESMITH. And while some have been bought by the military in Britain, they have been bought in a commercial configuration, just like the commercial airline.

They subsidized that entire development program, to begin with, and then what they do is they get their money back if it sells.

If it does not sell, why then, the Government is out the money. It has not been the practice of the U.S. Government to do that over the years here. I mean, we have to take the rap, and the risk of develop-

ing the airplane, and hoping that we can sell enough of them to pay off the development cost.

Senator LONG. Well now, for that very plane, what percentage of funds to develop that Electra were paid by the Government?

Mr. MONESMITH. No development.

Mr. WOODRUFF. None.

Senator LONG. You say your Electra is in competition with the Viscount?

Mr. MONESMITH. No.

Mr. KERBER. That is purely a commercial airplane.

Senator LONG. You say that is purely commercial. You did not receive any direct or indirect payment to develop that airplane?

Mr. MONESMITH. No, sir.

Senator LONG. What was your cost on it, do you know?

Mr. MONESMITH. The cost of development?

Senator LONG. Yes, of the Electra.

Mr. MONESMITH. I would guess it is around between $75 million and $80 million, for what would be called purely development. Of course——

Senator LONG. It was a very substantial venture?

Mr. MONESMITH. There is capital investment beyond that for tools.

Senator LONG. That was a substantial venture, was it not?

Mr. MONESMITH. Yes, sir.

Senator LONG. Let me ask you this: In developing the Electra were you able to build on top of information that you also had on other aircraft?

Mr. MONESMITH. Yes, sir; but it was also a commercial airplane, the Constellation.

Senator LONG. So far as you are concerned, you built the Constellation at your own development costs?

Mr. MONESMITH. Yes.

Senator LONG. And you built your Electra starting on what you knew about the Constellation?

Mr. MONESMITH. Yes; and before that the Lodestar, and before that the—and the original Electra, you see, we started out originally, as a commercial company, and we went for 4 years, and if there had not been a war we probably would still be a commercial company. But we had some skills developed, and the Government asked us to build some aircraft. We started out in the fighter field, and we have been building fighters for the U.S. Air Force. In fact, this is the first time in 20 years that we have not had a production contract for an Air Force fighter.

But basically our original line was commercial aircraft, and we have been fortunate enough to be able to stay in it.

Mr. KERBER. Senator, I would like to point out if it had been the policy or desire of the Air Force for us to collect some of that prior development from the Germans, we would have had to add it into the price.

The business might very well have gone to some foreign country, and all these other advantages which we listed would never have occurred.

So I think——

Mr. WOODRUFF. This, we think, is typical of the kind of benefits which the Government derives from our doing commercial work and pushing things and using things in the commercial field.

As a result, the Government has better things available to it. It gets overhead spread over a broader base, and so on.

Senator LONG. Go ahead, Mr. Gordon.

Mr. GORDON. Would it be fair to say that your chances of consummating such a transaction would have been considerably lessened if you had not developed the F–104 originally for the U.S. Government?

Mr. MONESMITH. Quite possible.

Mr. GORDON. Would it also be fair to say that the U.S. Government, through its sponsorship of the development of the F–104, has indirectly paid for at least some part of the development in the F–104G?

Mr. MONESMITH. Originally, yes, on that part which is common.

Mr. WOODRUFF. However, the U.S. Government also received 296 airplanes which are manned in squadrons all around the world as a result of that development.

Senator LONG. It paid for those, didn't it?

Mr. WOODRUFF. That is right.

Mr. GORDON. You say the Government paid for those, did they not?

Mr. WOODRUFF. That is right.

Mr. GORDON. It paid for the production in addition?

Mr. WOODRUFF. That is right.

Mr. GORDON. So we did not get this free; is that right?

Mr. WOODRUFF. That is right.

Mr. GORDON. What benefits——

Mr. KERBER. But they got value received.

Mr. MONESMITH. But they got what they asked for in the contract, sir. They got what they paid for.

Mr. GORDON. In production costs and in the R. & D. contract—however, what benefits does the U.S. Government get, if any, out of the German transaction?

Mr. MONESMITH. Well, there are $200 million coming into this country, of which $10 million will reside in Federal taxes, for sure.

Mr. GORDON. I do not mean in terms of taxes; I mean since they paid for part of the development indirectly of the F–104G, do they get anything? Any part of a royalty? Do they get any part of the profits?

Mr. WOODRUFF. They can have the advantage of all these developments that we are making, or having made, in order to build the 104G, and overall a better airplane available if they need it.

Mr. MONESMITH. To answer your question directly, they do not participate in the royalities or the profits. But I mentioned before, that one direct way they have benefited is that they canceled off some airplanes off the end of our line, and there were some terminated materials left over which would have had to be paid for, primarily material that we bought from vendors, and this was absorbed in this German contract to the tune of roughly $2.5 million, so they recovered $2.5 million that they would had to pay for and would not have been used had we not sold it to somebody.

Mr. KERBER. It probably would have been scrapped.

Mr. MONESMITH. I would like to point out that where the Germans are plowing in this $35 million, a little over half of that goes to equipment manufacturers, and this extends the state of the art in such things as an all-weather fire-control system, very sophisticated; new developments in inertial navigators, and in the German contract it is expressly stated that if the U.S. Government wants to buy those articles, not necessarily put it in our airplane, but any airplane they want to buy, they can pick up and buy the hardware at production costs rather than share in the development of that.

So that they get benefits in that manner as well; plus the fact that there is quite a problem—we would have had to lay off quite a lot of people if we had not gotten this, and so would some of our contractors and vendors and this, of course is a big problem to any manufacturer to keep his people working.

Mr. GORDON. Will some of the planes manufactured in Germany be sold to any of our allies?

Mr. MONESMITH. They have a right to be. They have to get permission from us to do it, and permission from the U.S. Government before it can be done.

It is possible that some might be sold or that a joint program might be worked out with Belgium and the Netherlands. This is not being consummated as yet.

Mr. GORDON. Don't some of these allies get foreign aid funds from us?

Mr. MONESMITH. Well, so far the ones that we have dealt with do not. But this may come up at some point in time in the future.

Mr. GORDON. I think this is a very interesting point.

Let us suppose that a country gets foreign aid from us. Now, this foreign aid can be used to buy such items as aircraft.

If this is so, would the royalty charge have to be paid with our foreign aid money?

Mr. MONESMITH. Well, normally, sir, the way that has worked in the past is when you give foreign aid in aircraft you buy it off our lines, and there is no royalty, and it is just a straight transaction from the U.S. Government, whether it be the Navy, the Air Force, to us, on Government contracts, and then the thing is transferred to the other Government.

So that there is no royalty or license fee involved normally in this sort of a transaction.

Now, whether or not the Government would ever buy off German lines direct or not is questionable.

Mr. WOODRUFF. If they did, the royalty that would be paid would be paid for the new developments, not for the Air Force developed portion of the airplane, as is spelled out in our statement.

Senator LONG. How much research and development do you have with the Government at the present time?

Mr. MONESMITH. Research and development?

Senator LONG. Yes.

Mr. MONESMITH. I would like to qualify what I am going to say to this extent: If you are talking strictly research and development——

Senator LONG. Contract, yes.

Mr. MONESMITH. And not development of hardware, in my division, the California Division, roughly we have about $3.5 million worth.

This is for engineering work primarily on certain aspects of developing new techniques with metal, developing aerodynamic principles. It is more closely true research work.

Senator LONG. You are speaking for one division.

Here is a statement taken from the Wall Street Journal:

Lockheed, in 1958, had a volume of $962 million, which included $323,900,000 for Government research and development contracts.

Is that statement correct?

Mr. MONESMITH. Well, quite possible. I do not know. We have four divisions, sir, and I do not keep track of what they do.

I have enough trouble with my own, but they have the Polaris contract, and they also have the Agena in our other divisions.

Senator LONG (reading):

Lockheed spent $25.2 million on its own research and development. This year the aircraft and missile maker expects to do $400 million of Government-sponsored R. & D., while digging into its own pocket for about $12 million.

Is that statement correct?

Mr. WOODRUFF. The $300 million figure would include mostly what I think we would call development work, not pure research; whereas the figure for our own expenditures would tend to be heavier on research.

Mr. MONESMITH. You see, they are getting hardware, they are getting Polaris missiles, and they are being fired, and there are satellites, and there are three of these Discovers racking up in the air right now, so this is not what you would call true research and development alone. That happens to be the total cost of what research is involved and what development, plus the hardware.

Senator LONG. In other words, that figure, do I understand correctly that that figure—if you do not have this information, I would like for you to supply it for the record——

Mr. MONESMITH. All right, sir.

Senator LONG (continuing).—I would like to know if those figures refer to the research and the manufacture of hardware, and if so, I think it would be well to have a breakdown of how much of that——

Mr. MONESMITH. Would you quote those figures again, sir?

Senator LONG. Yes. Here it is. This statement says:

Lockheed in 1958 had a volume of $962,679,211——

Mr. MONESMITH. Yes, sir.

Senator LONG (continuing).

Which includes $323,900,000 of Government research and development contracts. In the same period Lockhead spent $25.2 million on its own research and development program. This year the aircraft and missile maker expects to do $400 million of Government-sponsored R. & D.

Mr. MONESMITH. That amount, sir, includes hardware, I can tell you that right now.

Senator LONG (continuing).

While digging into its own pocket for about $12 million.

So it would seem to me it would be well if we had a breakdown of how much—if you can't provide it—how much of that you expect to spend on research and development, and how much of it you expect to spend on the actual manufacture of the item itself.

Mr. MONESMITH. We can provide this to you at a later date, sir.

Senator LONG. All right.

Mr. MONESMITH. I can tell you this much, that over $300 million of that $900 million was commercial airplanes.

Senator LONG. Yes.

(Information subsequently supplied by Mr. Monesmith follows:)

EXHIBIT IV

LOCKHEED AIRCRAFT CORP.
Burbank, Calif., December 21, 1959.

Mr. BENJAMIN GORDON,
Economist, Monopoly Subcommittee,
Senate Select Committee on Small Business,
Washington, D.C.

DEAR MR. GORDON: During my appearance before your subcommittee on December 9 the chairman asked for additional information that I did not have with me at that time. I am happy to supply it in this letter.

The chairman had quoted from a Wall Street Journal article saying that Lockheed's sales volume in 1958 included $323.9 million in Government research and development contracts, that Lockheed spent $25.2 million on its own research and development, that in 1959 Lockheed expects to handle $400 million of Government-sponsored research and development and about $12 million on its own research and development. Senator Long then asked for a breakdown between "pure" research and development expenditures and the development expenditures involving the manufacture of hardware.

There were no "pure" research contracts included in the Government research and development contracts for which Lockheed reported sales of $323.9 million in 1958 and estimated sales of $400 million in 1959. These Government contracts, however, included studies, testing, and various types of applied research in addition to work involving the manufacture of hardware.

Other research and development work, not covered by Government contracts, included $3.8 million in 1958 for "pure" or "extensive" research and $21.4 million for research and development involving or relating to the manufacture of hardware. In 1959 we now estimate that research and development not covered by Government contracts will total approximately $29 million. Of this 1959 total, about $6 million will be for "pure" or "extensive" research, and about $23 million will be for research and development involving or relating to the manufacture of hardware.

To avoid any misunderstanding of what we mean by "pure" or "extensive" research, we wish to define it as an investigation of fundamentals with no immediate practical objective but with the expectation of broadening the scientific knowledge on which the industry is based and with the faith that ultimate applications will be found to justify the expense of the research.

"Extensive" research also includes the accumulation, summarization, and extension of data previously developed with the objective of ascertaining the results of previous research and development and making the data available for possible future applications.

During your interrogation as committee counsel, you asked the amount of Lockheed's present net worth and a comparison with 10 and 15 years ago. At the end of 1958 the net worth of Lockheed Aircraft Corp. was $136.6 million. It was $46.5 million at the end of 1949 and $34.6 million at the end of 1944. During the period from 1949 through 1958, net worth was increased about $15 million through the sale of capital stock and conversion of subordinated debentures.

I trust that this material provides the answers to the questions raised and that you will feel free to call upon me for further information you may require.

Sincerely yours,

BURT C. MONESMITH,
Vice President, General Manager, California Division.

Senator LONG. Now, with respect to the things you are developing, I am sure that you are finding important secrets we need to know, a lot of know-how and a lot of patentable information with regard to Polaris and a lot of other things. Do I understand that that information is available to the Government in the production of things that the Government orders from you at no cost, beyond the original cost the Government has paid?

Mr. MONESMITH. Yes, sir.

Senator LONG. If a competitor wants to produce some of these same items or component parts that go into this, would he be required to pay either you or the Government directly or indirectly a fee for the production of these items that you have developed?

Mr. MONESMITH. No, sir. The Government gets a royalty-free, nonexclusive license to build these. They get drawings.

The way this works, Senator, is that—and I listened to the testimony yesterday, and I think there is an explanation for some of these things that were said—when we do an R. & D. contract, we tell them what they are going to get, and it is spelled out, and there are dates as to when they get the data, the equipment, the engineering, the test reports, the maintenance manuals, the erection manuals, everything that is involved that they want, everything they want to buy.

On these dates, generally speaking, this information is furnished right on the dates that is set. Sometimes there is slippage, but in 99 percent of the cases they get information.

Now, in the case of any of these items they get all the manuals, everything else, but they are furnished to the Government.

We are not required to furnish to anybody and his brother who decides that he wants to build a Polaris or something. He has to go to the Government, but the Government has all these manuals and data.

In the case of certain—where you are in the development period, these manuals, you have to go through the development flight test before the manuals are available, obviously, but once they are available, they get hundreds of copies of these things, and we send these things out by the ton, and it goes to various agencies of the Government, and they redistribute this to procurement areas they have.

They have what is known as air material areas, and we, as contractors, work under certain ones. Ours happens to be the Sacramento Air Material Area.

If they wanted to buy, overhaul, repair or buy the stuff direct, they have got the drawings, the maintenance manuals, and everything here.

Now, you cannot very well wrap up know-how and send it with that. I mean, we still have the know-how on how to do these things, but as far as the drawings, the manuals, if the company is a capable company and knows what they are doing, they can take this stuff and they can build it.

They have to have tools for it. If the Government wants to pick up the tools at our plant and send it to them, they can do that, too.

Senator LONG. If someone wants to bid on a part, do you have a practice that he be privileged to come and take a look at it and see what it looks like and see your drawings on it in order for him to bid?

Mr. MONESMITH. Well, there is a policy in the Air Force that they call "make or buy," and they go through the article, whether it be an airplane or missile and so forth and so on, and they say these things you should buy outside, these are primarily the things that you can buy outside.

There are some things you cannot very well split off from the man who is doing the actual work on the final article.

Then these are put out for bid in various different methods under various schemes the Air Force has, and when that is done, why, you give him all the information he needs to build it.

Now, he cannot decide necessarily to come in and decide he wants to build something that somebody else has got once the contracts are let.

Senator LONG. What I had in mind is this: Suppose someone wants to bid on this information, that is, bid on producing a component part; suppose you want to put a camera in one of these Polaris missiles you are building to take pictures to see what things look like from up there. Would a person wanting to make a camera have the right to come in and take a look at the camera that has been developed and see what it looked like, including the parts, in order to build it?

Mr. WOODRUFF. As Mr. Monesmith has said, the original builder or manufacturer supplies the required data and drawings to the Government. These are available through the Government. Now, as to something like a camera, it would depend upon the particular situation.

Uuder the patent-rights clauses used pretty generally in Government contracts, the Government gets the right to use any inventions conceived or first reduced to practice, as we mentioned in our statement, for reproduction of the article.

In the case of cameras, I would expect that there would very likely be some earlier patents and, in addition, some know-how and proprietary information to which the Government might not have rights.

If, nonetheless, as was pointed out earlier, the Government wishes to go out and seek competitive bids, and they can do so under the 1910 statute, which says that the Government may use inventions——

Senator LONG. After you develop the Polaris missile or any other item, if a competitor wants to bid against you for its production, does he have to pay you any patent fee or royalty or is it customary practice that he would?

Mr. MONESMITH. Not if it is for the U.S. Government. If it would be for the use of a foreign government, it would be classed as commercial, and then we would have to work out some deal with the Government. But if it is for the U.S. Government, the answer to that is "No"; he can come in and bid against us whenever there is a follow-on contract that is open.

Senator LONG. If a commercial firm wanted to buy any of these things that you developed with this research money, would he have the benefit of the patent or proprietary rights?

Mr. MONESMITH. Well, first of all, on this sort of stuff we would have to have the approval of the U.S. Government to sell it commercially, which you have to do in all cases of any type of war material, and it is very doubtful that a commercial firm would want to buy these patents and things.

Sir, in our particular side of the business it is pretty hard to patent the type of thing that we do.

For example, if you tried to patent everything, it would cost you so much doggone money that the Government would be paying considerably more just to research the patents and get them, you see; and the state of the art develops so fast that what you think you have got as a good idea this year is obsolete 6 months from now because somebody has come up with a better way of doing it.

Now, most of the patents that are developed in our business are patents that have to do with the skill and techniques of handling certain types of material.

We are a little different from the type of gentlemen who were here yesterday, who were small business, and who start the business on an idea, and then through the patents they get the right to build.

Because of our relationships with the Government, most of the things that we do in that field can become general knowledge anyway. I mean, if the Air Force wants to send North American to look into how we do something to make airplanes cheaper, they do that and, generally speaking, there are some patents, of course, where we develop something with our own money for certain uses, but this is a very small percentage of our business.

Mr. GORDON. Mr. Monesmith, let us suppose for the moment that instead of the Germans buying the F–104G, they bought the F–104. Now, this F–104 was developed primarily at Government expense; is that correct?

Mr. MONESMITH. If they had bought the F–104 off our lines there would have been no license agreement or anything else involved. We would have recommended that they go to the U.S. Government and buy them.

Now, the reason that we would recommend that is just because many of the articles on an airplane are furnished as what is known as Government-furnished equipment, and the Government has the procurement lines to those items directly.

They have established a relationship, and it is much easier for us to let them buy directly from the U.S. Government and furnish them.

But in this case the Government did not want to mess around with another development, a rather sizable one, and we dealt directly with them.

If they wanted us to license it to Germany, we would have had some charges against that, because we do not want to particularly give away our knowledge of how to build anything, and get nothing in return.

We are setting up a competitive outfit that takes business away from us in the end if we happen to have a good article, but that would have been negotiated with the Government as to what they felt was reasonable. But this is not the case in this particular instance.

Senator LONG. I see.

Mr. WOODRUFF. We would have had to do in that case, I think, all of the 11 things listed in the statement that we are doing with respect to the G.

Mr. MONESMITH. Except for the development part of it.

Mr. KERBER. They wanted to build it.

Sentor LONG. Suppose they wanted to buy directly from you instead of the Government, what would the situation be? Wouldn't

you have proprietary rights or would you have proprietary rights to the patents and the know-how on the development of that plane?

Mr. MONESMITH. Yes, sir.

Mr. WOODRUFF. We would.

Mr. GORDON. You retain title to that; correct?

Mr. WOODRUFF. Correct.

Mr. GORDON. But the data are owned by the U.S. Government?

Mr. MONESMITH. If the plane was exactly the same.

Mr. GORDON. Suppose it is exactly the same.

Mr. MONESMITH. If it is exactly the same they own a set of data.

Mr. GORDON. They own a set of data?

Mr. WOODRUFF. The actual pieces of paper we delivered to the U.S. Government belong to them.

However, there may be information disclosed by those pieces of paper which we developed independently of any Government contract, and which we consider to be ours.

We furnish data to the Government under two types of clauses, one which gives them unlimited rights to use it, and the other which gives them the right to use it for anything except procurement, and in order to get the right to have that second type of clause we have to go through a difficult negotiation to establish that the piece of paper or some of the pieces of paper contain propritary information which is peculiarly ours.

Senator LONG. Have you had any problem come up in your contract with your engineers and your technicians where a fellow would say that he developed some idea that is patentable and of substantial value, and that it belongs to him because he did it in his spare time or did it in his off-hours?

Mr. MONESMITH. No. We have an agreement with our engineers and scientists and manufacturing people wherein we will apply for a patent on an article if we think it is patentable. At the time we put in a request he gets $50; at the time it is granted he gets $100, and he gets 20 percent of the first $100,000, 10 percent on the next $400,000, and 5 percent thereafter.

Senator LONG. Is it possible for those people who work for you to apply in their own name for a patent on something that is relevant to your work, and to say that they did that in their garage on their spare time, and that belongs to them?

Mr. MONESMITH. Not relevant to our work, but we have cases where they go out and apply for patents that are outside of the industry or not—you have to have agreement with a man, sir, because you are working for the Government and you have to give the Government these rights to it, and therefore, he has to comply.

Senator LONG. That is what I want to know. How do your agreements with the individual work? Are your agreements such that you have the right to everything that is developed by him while he is working for you or what do you leave out of that that he can patent for himself?

Mr. WOODRUFF. Everything that is relevant to his work for us.

Senator LONG. In other words, as far as you are concerned, he cannot have some patents—he cannot patent on aircraft parts and aircraft equipment that he turns over to you, and some that he does not. Anything he develops with regard to aircraft he would have to turn over to you; is that correct?

Mr. MONESMITH. He signs that agreement, and he knows what it is, and it has these terms that I quoted to you when he comes to work for us. If he goes out and designs something for an umbrella or something that has nothing to do with an airplane or a missle, he can do that on his own; anybody can do that.

Senator LONG. The point I am getting at is that you, as a prudent employer, sign a contract with your employees where everything that is developed—if it has anything to do with his work—is turned over to you.

Why should the Government sign a contract with you where that which is developed belongs partly to the Government and the rest of it to you, why should it leave anything out?

Mr. MONESMITH. Sir, the first reason we have to do that is in our Government contract anything we do we have to give the Government a nonexclusive, royalty-free right to that patent. Now we cannot very well and not have these agreements with our people, because if something is produced, we have got to turn it over to the Government, and we have got to have some agreement with the man, in the first place. I mean, that is basically the reason for this thing.

Senator LONG. Here is my thought. You have made a statement that there are certain rights with regard to this fighter airplane that belonged to the U.S. Government, and certain rights that do not. Certain things, you have indicated, are yours on a missle, and certain other things are not.

Why should the Government sign a contract with you for $400 million where they fail to possess all of the rights that have anything to do in connection with the development of that missle or airplane?

Mr. MONESMITH. There are two pretty good reasons. One is that there is a lot of background that you develop over the years from all types of work, commercial work, that you do not sell with these contracts.

Senator LONG. The point is when you hire a man to work for you in your plant you agree that he turns over to you everything he has, all his knowledge, all his know-how, and all his patents, everything that has anything whatever to do with your business.

Mr. KERBER. But not all has prior patents.

Mr. WOODRUFF. Mr. Senator, there is quite a difference between the Government and our company.

Senator LONG. What proprietary right would he have the right to decline to turn over to you after he goes to work for you? Any know-how or any right to a patent which he acquires after he went to work for you?

Mr. KERBER. After.

Mr. MONESMITH. After. But if he had a half-dozen patents before he came to work for us we can't go back and go after them. He has got the right to use those.

Senator LONG. At the time you signed that contract with him, let us say you wanted to make a missile and he had several patents that related to a missle, would you not be prudent enough to put in the contract that he would turn over to you his patents that he had prior to the time he went to work for you, and if——

Mr. MONESMITH. I will have to tell you we probably would try, but if he had something he would not want to sell, we could not. There is a price connected with it. We would have to pay for it.

Mr. WOODRUFF. If he had something we would have to pay for it.

Senator LONG. Suppose he had the fundamental patents without which you could not make the missile. Would you sign a contract with him for $1 million for him to do research and development work for you or $5 million or $400 million—the figures do not matter—would you sign a contract for a large dollar amount with him without making it a condition of that contract that he would turn over to you the right to use that patent without which the missile could not be constructed?

Mr. WOODRUFF. If the patent was worth $1 million we would expect to have to pay him another $1 million for it, and by the same token if you want to buy out all of our——

Senator LONG. Right.

But wouldn't you recognize that your contract with him for doing the work for you henceforth would be valueless; it would be like a sack with a hole in the bottom of it, unless you had in the contract the condition that you also had the rights to the prior patents.

Mr. MONESMITH. Well, a good example of what you are talking about, sir, is the Constellation.

The Constellation had on it what was known as the Fowler flap. A Fowler flap was developed years back; it was a mechanism as to how to get the most out of a flap. We paid royalties on that flap for years and years and years to this man Fowler. That was a prior patent at the time the Constellation came out; in fact, we used the Fowler flap on airplanes prior to that time in our company.

There have been many of those over the years wherein inventors have ways and means of developing an idea that they patent, and you have to pay them for whatever you use on a thing.

Now, he did not work for us, but we paid him a royalty on it, and if he has got something good, if he has got something that is worth—the basic patents for a missile, the chances are pretty good that Lockheed is not going to build that missile because he is going to take and either form a company or at least get his money out of the patents to build the thing.

Mr. KERBER. That is a very good example.

Senator LONG. All you are saying there is that some fellow had a patent on something you wanted, and you paid him a fee. That is not the case I am describing at all.

I am talking about the case where you hire some man and pay him a great amount of money. You have got a contract here for $400 million, and you are telling us that some of that which is developed with this amount belongs to the Government and some of it does not. That is my understanding—most of it does, but some of it does not.

Here is your statement. You have certain rights on these airplanes the Government does not have. It is all yours, even though the Government is signing a contract with you for $400 million a year.

Mr. KERBER. When the Government bought the first airplane with Fowler flaps on it they did not buy any rights to that. That was ours. It was not developed under that contract when we negotiated with Mr. Fowler.

Senator LONG. There is no way on earth you could sell that because you did not have it to sell, because it belonged to somebody else.

What I am talking about is this: When the Government signs a contract with you, and signs these contracts for $400 million to develop

something, like the Polaris missile, why should they leave anything out? Why shouldn't they own rights, have any right that has anything to do with this thing they are buying?

Mr. WOODRUFF. Because the Government wants the airplane or it wants the missile, and it is not, we think, in the missile or airplane or in the invention business.

On the other hand, we are in the missile and aircraft business, and we are interested in inventions and developments which will enable us in this contract and in future contracts to supply you the aircraft and missiles which you want.

It is the overall end product that the Government contracts for and which it wants, and next year it is going to want a better overall end product, and we will hopefully be ready to produce that for it, because this year and last year and preceding years we have been on commercial contracts and on Government contracts, and on our own contractor-sponsored research, being developing new items here and there, and our subcontractors have been doing the same. So that next year when you come along, or when a commercial contractor comes along, we will be able to sell you this better end product.

But we will not be proposing even to sell you our know-how and our separate developments which we want to use year after year in our business; and you, not being in the airplane business, do not really need those. They are available to you when you buy them as part of an airplane, when you buy it from us or from anybody else.

Senator LONG. Let us consider this point of view, and I would like your reaction. I am not in the aircraft business. I am fortunate to have some holdings in some other businesses, but not in the aircraft business; but, as a taxpayer, I am paying some of this $400 million a year on this research and development that you people are doing, and I think you are doing a good job, by the way, and developing a good end product. But we are paying you, as taxpayers, to develop a product. Now, you may be developing something that has considerable future use. Suppose one of these days that we use something along the line of the missile you are developing to go from coast to coast in 15 minutes instead of 4 hours the way we do now.

As a taxpayer, I have paid you once to develop and produce it. Why should I pay you a royalty fee or a license fee a second time for the use of the information which you developed and which I had already paid for.

I see all three of you ready to answer that. Suppose you preside and determine who should answer first.

Mr. MONESMITH. May I answer that, Senator?

Senator LONG. Yes.

Mr. MONESMITH. You understand that once we produce an article for you, you have the right to take the drawings, the tools, and everything else you own, and you can go——

Senator LONG. That is the U.S. Government?

Mr. MONESMITH. Yes.

Senator LONG. Yes.

Mr. MONESMITH. And you can produce it.

Now, you cannot very well hedge out of the minds of the people that know-how to do the little tricks of the trade that make it a good-quality article, and things like that, because there is no way you can wrap

that up and package it and send it to anybody else. But a good qualified company that is in the same business we are in can take those drawings, and can reproduce it for you just as we can, but you just cannot pick up all this background knowledge and give it to somebody else.

I mean, there is just no way in God's world that you can get that information out of the heads of the people who are there unless you go and hire all the people, you see.

Senator LONG. I am not trying to do that. But my thought is this: Considering the fact that I am both a taxpayer and a consumer, why should I, as a taxpayer, pay you to develop something which you can make very well, and then turn around and, as a consumer, pay you a royalty fee, a license fee, and pay you for the benefit of these proprietary rights that you have in the things for which I paid in the first place?

Mr. WOODRUFF. Senator, You do not pay us for all of this development. You get what you pay us for. You pay us for the end article, according to the specifications that are incorporated in the contract; and you pay us for doing some development work to make this different from the one we built before or somebody else maybe.

You get all you need because you get this irrevocable royalty-free license to use anything that we developed on the contract for governmental purposes throughout the world.

Now, as to things——

Senator LONG. You just got through telling me that the contract is not complete; that anything you knew prior to the time you started I did not get; I did not have that in the contract.

Mr. WOODRUFF. That is right. If we had hired Mr. Fowler for a high salary, because he is a real inventive man, we would not have gotten the rights to the Fowler patents which he developed before he came to work for us.

Mr. KERBER. Or anything else.

Mr. WOODRUFF. Unless we paid him a seperate sum for it.

Senator LONG. Why shouldn't you negotiate for it at the time he wants the job? Why shouldn't you say, "Well now, Mr. Fowler, you want this job, and I'll tell you what we will do."

Mr. WOODRUFF. Maybe we would.

Senator LONG. "We will hire you and pay you a big salary, but when you come to work for us we want the benefit or at least we want some understanding and a firm agreement that we have the rights to these prior patents that you have, and this know-how you have."

Mr. WOODRUFF. In its contracting the Government does buy what it feels it needs and wants, and what it is ready to pay for at the time. But there is no particular reason for the Government, in effect, buying us out, buying out all of our skills and know-how and patent and proprietary rights on every contract that it enters into because they are all there available for the Government to come and use on a succeeding contract if it wants to. But it would be pointless to buy us out every time you placed a contract with us.

Senator LONG. Yes. This business is competitive, very competitive, is it not? I mean, you may not have a great number of com-

petitors, but those you have, fight you pretty hard to get the business, do they not?

Mr. MONESMITH. Yes, sir.

Senator LONG. For example, if the Government wants to develop a larger or different missile or a new type aircraft, the odds are that there are several other people who are going to put on their gloves and butt heads with you to try to get that business?

Mr. MONESMITH. Yes, sir.

Senator LONG. Now, I should imagine, whether it is correct or not—and you would know that maybe North American, Douglas, or other companies would come in here and they would say, "Well now, we think we can do this thing better than Lockheed. Here is what we have done. We have done some work on this type thing and we have some background knowledge. We have done some research on it and we really have a pretty good head start already in this field." Unless I miss my guess you would have a reply to that. "So do we. We have been thinking about this matter, too."

Would that be correct?

Mr. WOODRUFF. That is the good thing about our system, that keeps us constantly improving.

Senator LONG. Well now, would that statement be correct? At the time you go to negotiate——

Mr. MONESMITH. It depends, if we actually have the capability, sir, and the Air Force does not go out and just let anybody build an airplane; they try to go to the person who has the know-how to build that type of airplane.

Now, we specialize in certain types; some we do not build at all, and when the Government buys they take these things into consideration, and they go to whoever they think has the qualifications and background to do this.

For example, we had one of the first, if not the first, company-owned wind tunnel in the aircraft business. We built it ourselves, and we got a lot of good out of that wind tunnel. We operated on company money. Nobody paid us for the wind tunnel, nobody paid us to operate it. We did it with our own funds, and we did it on commercial business, because at that time, back in those days we did not have any Government business, and we got a head start, we were qualified in the aerodynamics field over and above many others as a result of that.

Senator LONG. I think you and I are not saying anything conflicting, but we are not talking on exactly the same subject.

What I am trying to get to is this: I believe just as you spelled out in your statement when it came around to building a 104G or a 104 fighter aircraft, you people had done some work in that field before the Government ever came to talk to you about it?

Mr. MONESMITH. That is correct.

Senator LONG. Since you saw that there was going to be a demand for such a product, you did some work on it prior to the time the Government came to you. You said in your statement, if I understand it that you had certain rights with regard to this type aircraft before the Government ever came to you at all; did you not?

Mr. MONESMITH. Well, let us not say that we had rights. We had capabilities and know-how, but much of that was not patented, sir.

Senator LONG. Some of it is, though, is it not? Would not some of it be patentable?

Mr. MONESMITH. I doubt very much. The only thing I know——

Senator LONG. Even your know-how is proprietary, is it not? The Government does not have a right to have that without paying you for it?

Mr. MONESMITH. Well, what you cannot do with the know-how is: There is no possible way you can pick it up and package it and send it around unless you take and ask us to send people, which you pay for, to somebody else to show them how to do something, and we do this all the time.

We have field service people, we have technicians, and if the Government wants us to send these people out to show somebody else how to do something, and they have done it on a number of occasions, they pay for the right, for the people that know how to do that, and they go over to some other manufacturer and show him how to do something that maybe we already know, but he has got the contract, but you do not have the right to call on us to send people on our payroll over to Joe Doaks over here to show him how to build our article without paying us for it. That is the proprietary aspect of this thing. We could not stay in business on that basis.

Senator LONG. The point I have in mind is a very simple point, which could be very pertinent. In seeking a contract to build something as significant as a fighter airplane—and particularly if you had a competitor who wants that same contract—if it is going to be a negotiated contract where the Government does not know precisely what it wants, to begin with, the fellow who has the best chance of getting it, all things being equal, would be the fellow who had made the most headway in that direction to begin with, wouldn't that be correct?

Mr. MONESMITH. Quite possible; yes, sir.

Senator LONG. So if you have done something along that line and have done some work on that type of aircraft to begin with, anticipating there is going to be a demand one of these days for a faster and higher performance aircraft than the Government presently has, you would likely have some certain proprietary patents, either in items or know-how at the time you are negotiating with the Government that would kind of give you a head start and a chance to get the contract. Does that make sense?

Mr. KERBER. Yes. But when we negotiate with you for a 104, say we are going to incorporate in that airplane and use a lot of prior manufacturing background and secrets and so on, we do not charge you anything for those, and you do not get any rights in it. If you want to buy them at that time, you may.

Senator LONG. All I am saying, and all I am getting around to is this: At the time the Government signs the contract with you, would it not make sense to the Government contracting officer to put in the contract that the Government has the benefit of what you had done before as well as what you are going to do in the future with regard to this product that you are going to build?

Mr. KERBER. If the Government is ready to pay for it.

Mr. MONESMITH. In effect, you get that now, sir. You get it now. The only thing you do not get is title to patents. Everything else you

get, but there is just no way to take and pick up background knowledge out of the minds of a hundred and fifty thousand or a hundred thousand people and transfer it.

Senator LONG. Well, all I am saying is that if you are hiring a subcontractor, it is just as if the Government is buying it from you.

Mr. MONESMITH. Yes, sir.

Senator LONG. You would not have a good lawyer, and you would fire him and get somebody else if you could not get a contract where either you or the Government is going to buy something from a man who has the patent and the know-how, without an agreement that you get the right to use that patent and know-how in the contract.

Mr. WOODRUFF. If you had a foreseeable independent need for those inventions, then maybe you would want to add something to the price and try to get the fellow, the contractor, to sell those inventions to you.

But you, by buying the article, you get the right to use the article, you do not need to buy the patent rights for that purpose, and so I think the Government, or we would feel that the Government, would be foolish to go along every time a contract is signed to buy all the patents that the company it is dealing with has. It would just shoot the cost of procurement all the way up.

Senator LONG. Here is the only thought that occurs to me on it, and I think I can, perhaps, better state it than ask a question, and then, perhaps, you can give me your reaction to it.

It would seem to me that about everything you did on the 104F, for example, was done in the hope of securing a Government contract to build such an airplane, and that you did it, because it is an airplane that would be useful for governmental needs. When you bargained for the contract, that was a part of the consideration either openly or tacitly. The Government paid you in dollars for your previous work when it signed the contract.

Mr. MONESMITH. That is not what the contract says, and the contract did not buy this.

Mr. WOODRUFF. That is not what the contract says.

Neither did we develop all these things specifically for the 104.

We have been working throughout our existence to build better airplanes, faster airplanes, and, in general, research programs and in connection with building different airplanes, and it was this accumulated store of knowledge that went into the 104, augmented by some work specifically directed toward the 104. That specific work for the 104 you probably acquired because it was part of the work to build the 104.

Senator LONG. Yes.

Well, I understand this, and all I was attempting to develop with you was a point of view rather than a fact. My reaction as a civilian and a taxpayer, is that I would like my lawyer, in negotiating a contract, to put in such a provision. Maybe you would not sign the contract, but I guess if I were paying $400 million, perhaps you would sign it.

Mr. MONESMITH. The reverse of this is where the Government buys a commercial plane from us and the commercial customers do not come back and ask the Government to absorb the costs that they have put into the airplane. They get the airplanes just like any

other commercial customer, right off the line, depending upon what they put in.

Senator LONG. Of course, my thought about it is that the commercial customer and the Government customer, in the long run, is the same fellow. It is the taxpayer who is paying the bill which is, incidentally, just the same as you.

I believe we have developed the point I had in mind sufficiently clearly.

Mr. GORDON. If the U.S. Government during the contract stage had asked for the right to give this information developed at Government expense to the NATO governments, that is, if the Government had asked for all foreign rights, would you have refused the contract?

Mr. MONESMITH. No. We would probably negotiate a different contract than we did.

Mr. GORDON. You mean you would have raised the price?

Mr. MONESMITH. Yes.

Mr. GORDON. If the Government had taken title to the 104 airplane originally, how would it have affected the F–104G transaction?

Mr. MONESMITH. Well, the Government did take title to the 104 originally.

Mr. GORDON. I mean patent rights and foreign rights. In other words, if it got all the rights of the 104, what would you have done?

Mr. MONESMITH. It would not have changed the know-how aspect of it. You right now have the rights to the patents on a nonexclusive basis.

Mr. GORDON. I am talking about commercial rights. Patent rights include commercial rights and foreign rights. I mean all rights. If the Government had taken title to this, how would it have affected this F–104G?

Mr. WOODRUFF. We pointed out in our statement that the payment is specified by our agreement to be for things in which the Goverment has no rights.

Mr. MONESMITH. Let me qualify this. The Germans are paying for development costs that the Air Force never paid for or the U.S. Government, and the Germans have the right in those things, and our Government does not have the rights in those things, and what he is saying here, paying for the development costs, they are spending their money for.

Mr. GORDON. But the 104G was really a further development of the 104, was it not?

Mr. MONESMITH. Right.

Mr. GORDON. Now, if the Government owned all rights to the 104, wouldn't they be able to share in all the profits that you get on the 104G?

Mr. MONESMITH. If they had asked for all the rights, to begin with, we would have negotiated a different kind of contract, with additional costs in it, and the answer to your question is yes, you would have had the rights.

Mr. KERBER. If they had bought the know-how.

Mr. GORDON. What if something results from R. & D. contractors had not called for. Do you have to inform the Government of that?

Mr. WOODRUFF. We do.

Mr. MONESMITH. Yes, sir.

Mr. GORDON. Is it in the contract that anything you develop——

Mr. MONESMITH. They get complete——

Mr. WOODRUFF. Anything first conceived or reduced to practice in the performance of the contract. It does not say it has to be related to the particular item.

Mr. GORDON. All byproducts, even if used in some other industry would have to be——

Mr. MONESMITH. That is quite well documented in the test reports and the data we furnished to the Government.

Mr. GORDON. You have been assuming that the Government does not have a need for rights. You say, well—the Government gets all it needs.

Now, perhaps the Government, if it had the rights on the 104, even though you might have charged the Government more money, could well have recouped the expense on the 104G by sharing in the profits.

Mr. WOODRUFF. If the Government wants to go into the airplane business that way, it can do it. But it would be spending money to acquire these rights, and in effect, taking its chances as to whether there later on would be a sale of the airplane to someone else. We think that is more the airplane business than Government business.

Mr. GORDON. Did you have a cost-plus-fixed-fee contract to develop the F104?

Mr. MONESMITH. No; only on the original prototypes. The rest of it was fixed-price redeterminable.

Mr. GORDON. I am talking about the development, not the production.

Mr. WOODRUFF. The development contract?

Mr. GORDON. Development contract. You had a cost-plus fixed fee?

Mr. MONESMITH. On the original prototype.

Whatever development was done on production and on the hardware in connection with delivering the hardware was done on a fixed-price redeterminable.

Mr. GORDON. Where would you have added in this particular fee that you talk about? Certainly it could not be added to the cost.

Would it be added into the plus part?

Mr. MONESMITH. Well, there would be an article in the contract specifying what rights you wanted, and you would pay for those rights under that article.

Mr. WOODRUFF. In the pricing of the contract it reflects all of the things furnished to you or sold to you in the contract.

If we, in addition to what we have sold you customarily, also sold you patent rights, that would be reflected in the price.

Mr. MONESMITH. Mr. Gordon, let me explain that for every customer we sell this airplane we lose three, I mean, we do not make all the sales that we go after, and no one else does either; and from this standpoint there is a risk involved in going out and trying to sell these things.

We invest quite a bit of money, and the Government normally——

Mr. GORDON. Are you talking about the F–104 now?

Mr. MONESMITH. The F–104 or any airplane you are trying to sell, whether it be the Government or a commercial airplane, the Government normally does not go out to try to do that sort of thing. They

do not go out and try to beat the bushes down, and try to sell an airplane. When they buy an airplane, they want it for specific use of the U.S. Government, they are not particularly interested beyond use of that.

Mr. GORDON. I am not sure of that either. We are also interested in other things.

Mr. MONESMITH. Well, I am telling you what has been going on in the past; that normally they do not go out and press a manufacturer's article to be sold around the world. This has just not been done, and normally they do not take that into consideration, and they do not think they should pay for these.

Mr. WOODRUFF. We took a risk on that original F–104 development contract, in that we did not know that that airplane would be bought for production purposes; yet we devoted a large segment of our engineering capabilities for a considerable period of time to it in anticipation and in the hope we would get the production. But there was no certainty that we would. We might; we risked doing it there when we could have used those capabilities in other directions.

Senator LONG. The Government is so much in the habit of giving everything away these days that I cannot complain too much about the Government not getting some consideration on this contract.

But I did want to ask this: Your statement on page 4 (see p. 159) says:

> In its license agreement with the German Government, Lockheed grants it the right to manufacture this new model airplane in Germany.

Is there any consideration for that?

Mr. MONESMITH. Only as part of just the royalty fees involved in the aircraft, sir.

Senator LONG. What is it?

Mr. MONESMITH. $15,000 an airplane produced, and for that they receive—we have to keep a staff of engineers to keep the airplane—all the changes going in.

Senator LONG. Do they pay you that in addition to the——

Mr. MONESMITH. In addition.

Senator LONG. Does that include in that $15,000 keeping, maintaining the people over there or do they pay that in addition to the $15,000?

Mr. MONESMITH. For that $15,000, we maintain a staff of engineers, inspectors, people there without them paying anything additional, up to a certain point. Anything beyond that point they have to pay for additionally But there is an adequate number of administrative people and technical people who are there for that.

In addition to that, there are some other things. We provide space——

Senator LONG. Can you break that down? You pay up to a certain point. How many planes do you estimate they are going to build? Do you have any understanding about that?

Mr. MONESMITH. I am sorry, sir. I would rather not say that; it is involved in the defense of the German Government. I can tell you personally.

Senator LONG. Suppose we try to get it, or try to get at it this way. I do not want to know it personally, but I want it for the record, the information I have in mind.

What percent of that, out of that $15,000, how much of that goes to your expense of maintaining these employees, and how much of it is a pure license fee for the use of patents and know-how?

Mr. MONESMITH. Well, I would guess that approximately one-third of it—we are taking a certain amount of risk in that because we have to keep a staff of engineers at home, keeping this thing up to date, and taking care of changes as long as they are in production in Europe, and we have to keep the staff in Europe, and this may vary from time to time, but I would guess when it is all over with, perhaps, one-third of the $15,000 would be straight——

Senator LONG. One-third would be the cost of the personnel?

Mr. MONESMITH. Two-thirds would be the cost of personnel.

Senator LONG. One-third, or about $5,000 of that $15,000, you think would be the fee for license?

Mr. MONESMITH. That is it, roughly.

Senator LONG. Know-how; and that type thing, proprietary rights, that you presently possess on that aircraft?

Mr. MONESMITH. That is it.

Senator LONG. As a legal matter, you did not have to sell that to Germany at all, did you?

Mr. MONESMITH. No, sir.

Senator LONG. And you could have charged anything you wanted to, or not sold it at all. If you had the freedom to sell or not to sell, you could have charged any price you wanted for it.

Mr. KERBER. We could have charged it, but not have gotten it. That was a negotiation.

Senator LONG. I say, to sell or not to sell, if you have the option to sell or not to sell, you can fix the price, but you can demand a price without which there would be no contract, can you not?

Mr. WOODRUFF. Sure.

Mr. MONESMITH. Are you talking about the contract originally with the U.S. Government?

Senator LONG. No, I am talking about this contract with Germany. You did not have to sign it. You are selling them certain proprietary rights as part of the contract. You did not have to sell those rights, did you? You can fix the price at whatever price you want to fix, and either get it or not get it, put it on a take it or leave it basis if you wanted to.

Mr. MONESMITH. That is right.

Senator LONG. So that the fee did not have to be $5,000. It could have been $50,000 or no sale, one way or the other.

Mr. MONESMITH. What you try to do, sir, is that you have got—this takes pretty high class people to do this kind of work, and you are in business to make money, and if these people from the standpoint of these people being tied up in this project for 3, 4, or 5 years, the project ends in 1966, and they have got to give all the data back to us, you see, but we want to make some money, these people could be doing something else, you see, which could be profitable we hope——

Mr. KERBER. More profitable, possibly.

Senator LONG. Those are all the questions I have.

Mr. GORDON. Mr. Monesmith——

Mr. MONESMITH. Yes, sir.

Mr. GORDON (continuing). What percentage of total airplane sales are made to the Government?

Mr. MONESMITH. 55 percent is commercial, 45 percent is military in 1959, in my California division.

Mr. GORDON. 55 percent commercial and 45 percent Government? How does that compare, say with 1942–1943? You can select any date you wish.

Mr. MONESMITH. Well, during the war years we were prevented from doing commercial business, obviously, and it was all military. But we started right after the war; we were fairly high on commercial. We were building primarily Constellations, and we did have other Government business, and I cannot accurately tell you what it is, but it was a higher percentage commercial than it was military.

I could get these figures for you if you are interested, but I do not recall. But in the last 3 years it has run roughly, last year it was about, well, it was 55 percent this year; it was around 48 percent last year, and about 38 percent the year before on the commercial side.

Mr. GORDON. Can you give us the value of your net worth at this time?

Mr. MONESMITH. I do not exactly remember. I think it is in the neighborhood of $128 million.

Mr. GORDON. $128 million. How does that campare, say, with 1941 or say 15 years ago? Pick any date for which you have the figures.

Mr. MONESMITH. I do not have the figures in my mind. I could get that for you though.

Mr. GORDON. Could you supply it for the record? [11]

Mr. MONESMITH. Yes.

Mr. GORDON. In your statement you refer to certain material which the U.S. Government has no right to get, no right to see, no right to use. What kind of material is this?

Mr. WOODRUFF. There we were in the statement talking about the development work for the German Government, which the Government of Germany, the German Government, is paying for, and which will belong to us, but be licensed to the German Government.

We did make the further point that all this development will be available to the U.S. Government without additional development cost.

Mr. GORDON. You do not say that. You say——

Mr. MONESMITH. Let me explain that, sir.

We do not sell our techniques on planning paper, tool design paper. We sell the design, but not some of the background material.

The way we handle our procedures within the company, that is not bought by the U.S. Government when they buy an airplane. That is one of the ways of doing business we have developed over the years

Those things normally, if somebody else manufactures the airplane they have to have some of this stuff, they have to have most of it, if they can start from scratch on a total airplane.

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[11] Information subsequently supplied by Mr. Monesmith, in a letter to Mr. Gordon, dated Dec. 21, 1959:

"During your interrogation as committee counsel, you asked the amount of Lockheed's present net worth and a comparison with 10 and 15 years ago. At the end of 1958 the net worth of Lockheel Aircraft Corp. was $136.6 million. It was $46.5 million at the end of 1949 and $34.6 million at the end of 1944. During the period from 1949 through 1958, net worth was increased about $15 million through the sale of capital stock and conversion of subordinated debentures." (See exhibit IV, p. 138, for letter.)

Now, if they are just building a part, naturally, they only need the drawings and the erection and maintenance. But those are the types of things that normally the Government does not buy nor do they ask to buy.

Anyhow, it is a question of what they would do with it if they bought it. They do not need it.

Mr. WOODRUFF. They would not need it unless they were going to go out and set up a new plant.

Mr. GORDON. You stated that 45 percent of the total sales, airplane sales, are to the Government.

Mr. MONESMITH. That is in 1959, in my division.

Mr. GORDON. You also state that you would ask for a higher price or you would have asked for a higher price if the Government had asked for all rights

Now, suppose the Government says:

I am not going to give you any more money for this. We are paying for this and we feel it is coming to us.

What alternative would you have had? Would have you said, "We won't take it?"

After all, 45 percent of the total sales to the Government is fairly substantial. In 1958 was it also——

Mr. MONESMITH. I think we would sit down and decide whether we would pursue this airplane, whether we would spend any additional money on it, trying to sell it any place else, because we would get no return for it in so doing.

If we decided that this airplane, which probably we would, was strictly for the U.S. Government, and we would build what they asked for and no more, no more sales programs anywhere to sell it to anybody else, the answer is that we probably would take it.

Mr. KERBER. We do not think any other company or any of our competitors would have given in to you either.

Mr. MONESMITH. We would not have tried to expend any additional funds to try to sell it to anybody else because there is no remuneration, no way of getting your money back.

Mr. WOODRUFF. It would depend upon the size of the contract and the things you are asking us to include. We would have to look at all of that.

Mr. GORDON. Would you admit there was room for bargaining on the part of the Government in this particular case, and it could have gotten more than it actually did get?

Mr. MONESMITH. It could have if they paid more for it but the question is what would they have done with it after they got it.

Mr. WOODRUFF. There is room, and the Air Force and the Navy have authority now, if they think it is worthwhile to do it.

Mr. GORDON. You asked what can the Government do with it. You said the Government is not in the aircraft business, but it certainly spends a lot of money on aircraft, and I would say that to a considerable extent it is in the business, even though it is not manufacturing it.

Mr. MONESMITH. That is what we mean, in the manufacturing business, because these things have to do with producing the airplane, not necessarily operating the airplane.

Mr. GORDON. As a hypothetical example, if it took title to the F–104, and if the German Government asked you to produce F–104's for them, you would have had to pay, perhaps, the Government a royalty or, perhaps, you would have offered to buy the patents. There are many things that the Government could have done with these rights.

You are assuming that the Government would take these rights and just put them away in a drawer and forget about it. Perhaps it could recoup some of the funds spent on development.

Mr. MONESMITH. Unless the airplane was sold to somebody else, the chances are they would have put it in a drawer.

Mr. GORDON. They could do that.

Mr. KERBER. When we give the Government a nonexclusive right we also retain the right.

Mr. GORDON. To use it.

Mr. KERBER. Yes.

Mr. WOODRUFF. We make use of it in other airplanes commercially and other airplanes for the Government.

Mr. KERBER. If the original 104 experimental R. & D. contract for two airplanes were carried out, suppose you had paid us for all our know-how and after the testing of those two, it is dropped. That is why it is not wise to do it on every procurement for you people.

Senator LONG. I have just one further question and then I am through.

I was looking at the testimony in 1946 of Mr. Irving Steward [11a] who was Deputy Director of the Office of Scientific Research and Development, and I am going to read some sentences from that testimony:

Members of NDRC decided that some modification was required if research and development on weapons of war was to be conducted by the most competent and experienced organizations in the country with the speed which the state of world affairs indicated was essential.

Further along he says:

With the adoption of the long form clause NDRC signed a number of contracts with industrial organizations which had been hanging fire for several months pending agreement upon a mutually satisfactory patent clause.

What that controversy was, as I understand it, was that the National Defense Research Committee had been seeking to obtain full patent rights, that is, exclusive Government rights to the information that was developed on these Government contracts, and there were a number, and a very considerable number, of business organizations which refused, even in wartime, to do research work for the Government unless they could retain private patent rights to these things that they develop with Government funds.

Was Lockheed one of these companies?

Mr. WOODRUFF. I think we were—I do not know whether we were involved in that particular investigation or consideration of this problem, but we have been represented at various times in the past in discussions of this problem because, as the Senator knows, I am sure, there have been numerous studies of it, going way back to the study in 1926, and the great majority of these studies have resulted

[11a] Hearings before the Special Committee on Atomic Energy, U.S. Senate, 79th Cong., 2d sess., on S. 1717, a bill for the development and control of atomic energy (pt. 3), Feb. 7, 8, 11, 13 and 14, 1946.

in the recommendation that title to inventions be left in contractors and that the Government take only the license.

Senator LONG. Here was this Mr. Stewart testifying on behalf of Dr. Vannevar Bush, who was, as you know, in charge of developing atomic energy for this Nation during the war in 1942. That was a matter of national survival.

The chances are if somebody got it first they would have won the war. His testimony here was that a great number of American concerns were unwilling to do scientific and development research on atomic energy for the United States even in war times unless they could have the benefits of exclusive rights, patent rights, to discoveries and inventions, which may have been developed under these contracts, and which Dr. Bush, and the Government in general, did not think they should grant.

In other words, I was curious to know if your organization was one of those that took that attitude.

Mr. WOODRUFF. We were not involved in the Manhattan Project or the Atomic Energy side of the picture in that period of time.

Senator LONG. Those are all the questions I have in mind, but I would like for you to confirm that to me, whether your company did decline in wartime to do research unless it could retain patent rights on what they discovered under Government-sponsored research.

Mr. KERBER. You mean in the nuclear field?

Mr. MONESMITH. In the field in which Vannevar Bush was involved?

Senator LONG. I mean in any field.

Mr. WOODRUFF. I think the answer is we went all out, as we think most other industry did but, at the same time, we were trying to convince the Government that the better policies lay in what are the present policies of the Department of Defense.

Mr. MONESMITH. We never refused to do anything in wartime that the Government asked us to do.

Senator LONG. There is oftentimes room for differences of opinion. But my reaction would be that in wartime it would seem to me that any concern, particularly as long as they were making a profit out of it, ought to be willing to do whatever was necessary or whatever they could do to defend their country. I feel they should, and I did not have any impression that your organization failed to do that.

Mr. MONESMITH. We never refused to do that, and the amount of research and development that was done during the war was practically nil, because all our energies were in producing aircraft.

I should tell you that this patent situation is more important to what normally is termed small business than it is probably to some—a company that deals primarily in defense work, such as an aircraft company, and the reason we could not live as the Lockheed Aircraft Co., and I doubt if anybody else could in the aircraft industry, if we did not have the support of these small companies—for instance, you can see out of 632 affected by these German licenses there are over 400 of them, over 500, and these people set up these companies on the basis of certain skills, techniques, patents, and so forth and so on, and we need those articles to build a final article.

We do not want to get in the business of designing and building this stuff, and it is to the advantage of the Government that you

pick the best articles to put in the end product, and it is more important to them really than it is to the major manufacturers.

Senator LONG. All right. Thank you very much, Mr. Monesmith. Your prepared statement will be included in the record at this point.

PREPARED STATEMENT OF BURT C. MONESMITH VICE PRESIDENT, LOCKHEED AIRCRAFT CORP., GENERAL MANAGER, CALIFORNIA DIVISION

Mr Chairman and members of the subcommittee my name is Burt C. Monesmith. I am a vice president of Lockheed Aircraft Corp. and general manager of its California Division with headquarters in Burbank, Calif. Our company, as you undoubtedly know, has been engaged in production of commercial airplanes since 1932 and military airplanes since 1938.

In my official capacity I have had direct and personal knowledge of our contracts with the U.S. Air Force covering the design, development, and production of the F–104 Starfighter—dating back to 1952. And I actually participated in a great many of the negotiations and agreements with the Federal Republic of Germany during 1958 and 1959 covering its purchase of an all-weather fighter based upon the Starfighter concept.

I believe that therefore I have first-hand knowledge of the matters of concern to you in your present investigation. To provide additional detail or clarification, I have brought with me today Mr. Kerber, our corporate contract officer, and Mr. Charles D. Woodruff, a member of our legal staff. In the event you need still more material, I can assure you that we will obtain or prepare it for you and furnish it promptly.

It is our understanding that you are seeking information germane to the question of whether in the financial relationships and results of Lockheed's contracts with West Germany the interests of the U.S. Government are being properly served. I most certainly can assure you that we are in full sympathy with the objective of your current inquiry.

And I can tell you sincerely that we believe our agreements with the German Federal Republic are serving the best interests of the U.S. Government and people.

We believe they are in line with America's enlightened policy of cooperation with friendly foreign governments. They conform to our Government's defense goals of improving the ability of these friendly governments to share the burden of global defense. They are contributing to the advance of American technology and lowering the cost of complete military systems to our own Armed Forces. They are generating tax revenues and improving the American balance of trade. And they are aiding the American economy by providing upward of $200 million to provide some 5,000 jobs in the United States—spread among our own company and more than 600 other American companies scattered throughout most of the United States that are partners with us in producing this new German plane.

I can summarize the history of the F–104 Starfighter very quickly. Our own design studies began in 1950, and we made our formal proposals to the Air Force at about the same time that the appearance of the Russian jet MIG's in the skies over Korea showed the need for a new American fighter with far greater performance than any our Nation had available at the time. Further design studies and negotiations culminated in March 1953, with the receipt of an official go-ahead from the Air Force to develop and flight test two experimental prototype F–104s.

Contracts with the Air Force, originally calling for 724 planes with a value of more than half a billion dollars, were reduced later by cutbacks and terminations. Ultimately the U.S. Air Force contracts produced a net total of 296 airplanes in 4 different configurations. The total value, including spares and related equipment, is approximately $360 million.

Three years ago when the German Ministry of Defense began looking for a fighter airplane to fulfill its role in the mutual defense efforts of the western nations, it closely examined more than a dozen aircraft from the United States, Great Britain, and France. It conducted an unprecedented 2-year evaluation of several of these, including one French, one British, and at least one other American plane besides the F–104. Teams of German pilots and technical and manufacturing personnel visited our plants before selecting the F–104-type for their principal fighter aircraft.

Starting in December 1958, we began discussing the configuration and contractual matters with a German technical team. I want to stress that in these

negotiations Lockheed followed the requirements of the U.S. State Department regarding licensing of implements of war to foreign governments. Beginning in December 1958, we submitted to the State Department copies of major drafts of the license agreement. We similarly kept the Department of Defense informed of the status of these negotiations. And the final agreement was furnished to and approved by the State Department—after consultation with the Department of Defense—in March, 1959.

The first of our two contracts with the Federal Republic of Germany provides that Lockheed will do two things. First, it will perform research and development and flight test for Germany of a new aircraft designated as the model 683–04–07. For convenient reference this new model aircraft being developed under the German contract is identified as the F–104G. But it will be substantially different from the F–104 models delivered to the U.S. Air Force. The U.S. model was a day superiority fighter. The German is an all-weather fighter with fighter-bomber capabilities. Development of this new single-seat airplane will require the expenditure of some $35 million by the Germans. This $35 million expenditure may be compared with the total development cost of $54.5 million paid to us by the U.S. Air Force on its single-seat F–104 models.

I should like to stress the fact that all of the $35 million development cost will be paid by the German Government. Our German contract provides that the U.S. Government will not in any event be required to pay any portion of this development cost.

Second, this contract with West Germany provides that Lockheed will manufacture in the United States and deliver to the German Government a substantial number of complete airplanes of this new type.

In its license agreement with the German Government, for a fee Lockheed grants it the right to manufacture this new model airplane in Germany. Lockheed also agreed to furnish technical data, manufacturing information or know-how, and technical assistance necessary to enable the Germans to manufacture such aircraft. Lockheed did not sell the data or information as such but rather granted the Germans the right to use such information for a limited period of time. Upon completion of the license term on June 30, 1966, the German Government must return to Lockheed all of the data furnished to it.

More specifically, Lockheed did not sell to the Germans, nor was any charge made to them for:

1. Technical data in the possession of the U.S. Government or in which the U.S. Government has a right to possession and regarding which there is no prohibition against use by the U.S. Government and disclosure to others (other than reasonable charges for reproduction, handling and mailing, and other similar administrative costs).

2. Royalties or amortization for patents or inventions in which the U.S. Government holds a royalty-free license.

Our license agreement specifically provides that there is no charge for such information. And in addition it specifically provides that all rights transferred by Lockheed to the Germans are subject to existing rights of the U.S. Government.

An initial fee and royalty payments provided in the license agreement are reimbursement to Lockheed for these following materials and services:

1. The furnishing by Lockheed, and the right of Germany to use, only technical data:
   (a) to which the U.S. Government has no possession or right to possession;
   (b) to which the U.S. Government has no right to use or disclose to others for use;
   (c) to which the U.S. Government has no royalty-free license; and
   (d) which is not in the public domain.

2. Within the framework of item (1) above, the right of Germany to use manufacturing techniques, procedures, and methods developed by Lockheed over many years of experience in the design and manufacture of aircraft.

3. The furnishing by Lockheed to Germany of general management advice and information relating to the manufacture of a complex, high performance aircraft.

4. The right to use Lockheed's trade names, trademarks, and other proprietary designations.

5. Certain warranties by Lockheed relating to the F–104G.

6. Patent indemnity to Germany for infringement of German patents in an amount up to $1 million.

7. The furnishing by Lockheed to Germany of assistance in obtaining materials from third parties.

8. The right to use certain Lockheed inventions in which the U.S. Government has no interest.

9. The furnishing by Lockheed to Germany of certain technical assistance.

10. Physical reproduction of the technical data.

11. Furnishing by Lockheed of office space, equipment, and services for the German representatives in Burbank.

In addition Lockheed undertook to give factory training to unlimited numbers of German personnel for another fee.

Lockheed has not granted any licenses relating to the F–104 to any German firm or corporation. We have two agreements with an organization know as ARGE–104, which represents the four German firms selected by the German Ministry of Defense to manufacture the F–104G. These contracts cover the purchase by ARGE on a regular commercial basis of tools, "knock-down" airplane kits, parts, and other equipment that may be required by the manufacturers in the inital phases of their program.

By a separate Government-to-Government transaction, the Federal Republic of Germany has purchased from the U.S. Government, with German funds, a quantity of U.S. Air Force F–104F two-place trainers. We are manufacturing these airplanes in the United States and delivering them to the U.S. Air Force, and in turn the United States is transferring them to the German Government. We have not contracted with Germany to grant it any rights in connection with this F–104F airplane,

I would like to emphasize that the technical assistance, knowledge, and data for which Lockheed is to receive payment from the Germans, do not included any for which the U.S. Government has paid or to which it has a right to possession or use.

Our F–104 contracts with the U.S. Air Force all contain standard patent rights clauses which grant to the Government an irrevocable and royalty-free license for use throughout the world of inventions, improvements and discoveries conceived or first reduced to practice under or in anticipation of the Air Force contracts. These clauses do, however, leave title to such inventions in the contractor. Thus the Government has the rights arising out of performance of the contracts which it needs. The contractor remains in a position to use its inventions and developments commercially.

The great importance to the public interest of the safeguarding of contractor's proprietary rights, we believe, has been clearly and strongly established. Moreover, in the manufacture of an airplane, large masses of data and information—documents used by the manufacturer and not required by the U.S. Government—are necessary to facilitate manufacture of the article. One set of this kind of data that we shall supply to Germany will consist of thousands of pieces.

The new airplane that Lockheed is developing at German expense has capabilities that are broader and in advance of those of the airplanes sold to the U.S. Government under contracts we have now completed. The technological improvements being incorporated in this model now become available to our own Government. And they are available to our own Government without payment of development cost.

The Air Force, too, already is benefiting from the German participation in this program. It is paying less for its F–104 spares because of continued production at Lockheed of many items common to both planes. Its costs of terminating the final F–104 production contracts were reduced by about $2.5 million by diversion of terminated materials from Air Force contracts to Lockheed production of the new German plane. And the German orders have helped to keep together the teams of skilled engineers, craftsmen, and administrators within our own company and hundreds of other organizations who are thus ready at any time to swing into the development or production of new weapons for the U.S. Government.

Advantages to our Government in other ways include upward of $10 million Federal taxes that our company and other firms will pay as the result of the German program—$200 million worth of business to American industry that will improve our balance of trade. Our surveys show that the 632 companies having a share in the German F–104G program are located in 27 States—15 of them east of the Mississippi. More than 400 of them are small businesses with fewer than 500 employees. And the remainder of the larger companies, of course, spread their work among many more smaller organizations.

But perhaps even more important is the way in which this NATO partnership is bolstering our stand against the danger of aggression from the East. These planes strengthen German participation in the NATO alliance, reduce the cost of American mutual defense aid programs, and lessen the burden upon our own armed forces—and American taxpayers.

In summary, gentlemen, I want to point out that Lockheed and other companies in our industry have been working for many years under State and Defense Department policies covering the foreign licensing of U.S. military products.

The ground rules are well understood by the Department of Defense, the State Department, other U.S. Government agencies, by the foreign governments, and by private industry. We believe they are fair to all parties in this country and abroad. We believe they serve the best interests of the U.S. Government and protect the legitimate and proprietary rights of private companies. We would like to see them continued and believe that no major changes are needed.

Now, I know that my statement necessarily has been somewhat general and perhaps far less detailed than you may wish. With the help of Mr. Kerber and Mr. Woodruff, I will do my best to answer any questions you may have. Thank you.

Senator LONG. We will now hear Robert C. Watson, Commissioner of Patents.

Mr. Watson, I am going to instruct the reporter to print your statement and the attachments to it following your oral testimony.

Mr. WATSON. Yes, sir.

STATEMENT OF ROBERT C. WATSON, COMMISSIONER OF PATENTS, DEPARTMENT OF COMMERCE, WASHINGTON, D.C.

Senator LONG. I will ask you to just briefly summarize the statement that you have here.

Mr. WATSON. I appear here not because I am Commissioner of Patents, but by reason of the fact that I am chairman of an interdepartmental committee which was established at the request of the Administrator of the General Services Administration.

It includes representatives of the various departments, and it is charged with the duty of ascertaining, if possible, how patent rights which eventuate from research contracts financed by the Federal Government, may be best divided in the public interest between the Government and the contractor.

That study group, officially designated study group fourteen, met upon a number of occasions during the period of the last 2 years. It realized from the start that it did not have sufficient information upon which to base firm recommendation to the General Services Administration. It worked diligently, however, in the effort to devise questionnaires to be submitted to industry for the purpose of obtaining the information. It finally realized as a study group it was not able to cope with that situation. Every member was a full-time Government employee, busily engaged in necessary work incident to his own office, and that it would be necessary for us to have help.

After considering all the possibilities, and receiving the recommendations of representatives of the Bureau of the Budget, who are concerned with questionnaires issued by governmental sources, it was voted unanimously that we should seek the aid of the Patent, Trademark, and Copyright Foundation of George Washington University.

The foundation was alerted and considered the proposal. It agreed that the purpose of the proposed study was a worthy one and devel-

oped a proposal which was submitted to the General Services Administration.

The General Services Administration has, I believe, agreed to that proposal, and I am in hope that the arrangement will be consummated today by the exchange of letters between the foundation, which is a university organ, and the General Services Administration.

Pending the report of the foundation, the committee has suspended its operation, and will resume its deliberations at the time when it has received the report of the foundation.

Senator LONG. So, in effect, the committee has farmed out this study to the foundation?

Mr. WATSON. That is the present status of affairs.

Senator LONG. When do you expect that report to be completed? Do you have any deadline?

Mr. WATSON. It calls for the work to be done within a year, but we hope very much that it will be done in a considerably shorter period of time.

Senator LONG. It would seem to me that they ought to be able to come up some kind of a recommendation in a period of 4 months or four and a half, providing there are not too many people working on it.

If you put too many minds to working on it, I can see where by multiplying the number of people you would have more possibility of disagreement.

Mr. WATSON. Well, they wish to place at the work the best qualified men whom they have at the university, two professors of economics, and it is contemplated that each shall spend a certain number of days a month at this task. They will have a staff. The effort could be considerably expedited if more money was available.

The total sum which is involved is only $28,000, and you can readily see that for that sum a limited amount of time is made available.

Senator LONG. Mr. Watson, you would, perhaps, be the best witness to answer this question. What is the philosophy or the point of view in the patent law, the philosophy in not making it possible for a corporation to apply directly for a patent?

Mr. WATSON. You mean, say, that the inventor himself must apply for a patent and that application may be made in the name of a corporation?

Senator LONG. My understanding is that it cannot be a corporation.

Mr. WATSON. That is right.

The statute has always been that way. The philosophy, I suppose, was developed in 1790, when individuals were the sole source of invention, and there were no corporation research teams such as currently are at work. The philosophy has been to emphasize the person of the inventor for his greater recognition and protection.

But it is a proper provision of the law, although changing times may lead us to make exceptions, such as have been made in certain other countries in which it is not rigidly insisted that the inventor be the person who makes the application.

In this country the inventor must make oath that the invention is his invention and no other's, invention being deemed to be a personal matter.

Senator LONG. Yes.

I just wondered whether there was some economic or social philosophy behind the law, perhaps, relating to the thought that maybe it was intended to limit it to just the first person who came up with the idea. By the nature of things, it could not be a corporation. Just what is the rationale behind the law?

Sometimes we find things in the law and wonder how it got that way, and I am curious as to how that one came to be that way.

Mr. WATSON. That has certainly been the way it has been all during my professional career. I have heard suggestions that that is not the way that it should be in the future, but I would prefer to have it that way. We are at present charged by statute with the responsibility of giving the patent to the first inventor, which is a rather personal thing, and not, as in some foreign countries, to the first one to deposit the application in the Patent Office. Proofs are adduced to show which of two rival inventors for patent for the same invention, was actually the first.

So it is a personal thing as yet, and if any change is proposed, such proposal should be most carefully studied because this procedure is rather basic with us.

Senator LONG. Yes.

Can you tell me briefly what you think this task force, of which you are a member, did accomplish during the 3 years it was considering these problems?

Mr. WATSON. That is 2 years, I believe.

Senator LONG. Two years.

Mr. WATSON. The members of the task force——

Mr. GORDON. Excuse me.

As I understand it, this task force was originally set up by a letter sent by President Eisenhower to Mr. Floete, Administrator of the General Services Administration, in September of 1956.

You say it was established in August of 1957. What happened between September 1956, the date of the letter of authorization and August 1957, when the task force was set up?

Mr. WATSON. I am not able to answer that question.[13]

Senator LONG. During the 2 years that the task force has had this problem, did it come to any particular conclusions?

Mr. WATSON. I have outlined already, rather briefly, the conclusion of the task force, namely, that while each and every member of that force had his own opinions as to the manner in which patent rights eventuating from Government-financed research should be divided between the contractor and the Government, it was realized that we did not have at hand facts upon which to base a firm group conclusion. I mean facts which could be developed only by investigation in the field.

We realized that the various policies of the several departments and agencies of the Government had been in full effect for quite a number of years. In order to determine which of those policies had in practice worked most satisfactorily in the public interest and which had not worked so favorably in the public interest, it was thought to be necessary to find out what had happened as a result of the practice of those several policies in the past.

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[13] See exhibit V, p. 165.

For instance, the policy adopted by the Department of Defense has resulted in patents covering inventions developed during Government-financed research to become the possession of individuals and corporations, in large number.

The question was, what had happened as a result of the pursuit of that policy for so long a period of time.

Had those patents been used as patents are supposed to be used? Had they been laid on the shelf? What had happened to them?

The Department of Defense, I assume, would know in some instances what had happened and particularly with respect to the more spectacular inventions. In the main, however, such information can only be obtained from the recipients of such patents.

But we actually had no information which was indicative to us that that policy was a good one or a bad one.

Of course, the patent is supposed to advance the arts. The arts are advanced when the public receives the subject matter of the patent in a usable form, and we did not know, in our considerations, whether or not the public had been the recipient of the benefits of the inventions covered by the patents. I doubt that there is any agency of Government or any statistical organization which has that information; at least we could not obtain that information from any other source.

Senator LONG. Let me ask you this question, sir: Who supports the George Washington Patent Foundation? Where do its funds come from?

Mr. WATSON. That is supported by funds contributed by many persons throughout the country.

I have furnished to the committee a document, all the documents which it needs to evaluate that Foundation, and included in those documents is a statement of the funds which have been received from the various contributors.[13]

I would say that the contributions come from many, many sources, including members of the patent bar, like myself, who are interested in the welfare of the patent system.

Senator LONG. I had heard a suggestion that a great portion of those funds came from the Patent Law Association and persons who hold patents.

Mr. WATSON. Well, I would say that in large measures the patent bar of the country, as individuals, support it.

I doubt that you will find in the list of contributors many patent law associations, but they support it in principle, if not financially.

Senator LONG. Do you regard a patent as being a monopoly or a monopolistic right?

Mr. WATSON. The word "monopoly" is used. I avoid its use because of the ill fame that some monopolies have acquired.

I say that it is a document which vests in its recipient a right to exclude others from the practice of the invention which he himself has made for a limited period of time, and if it is ever characterized as a monopoly it should never be mentioned as such in the same

[13] See exhibits V p. 165, and VI (A)(B) and (C), beginning p. 170. See also prepared statement of Mr. Watson, p. 167.

sentence or even in the same paragraph with some of the other things which we call monopolies.

Senator LONG. Well, my thought about the matter is that it is the right to a monopoly. Monopoly would be oneness or singleness. Of course, it might sound better to say it is a right to the exclusive use of an idea.

Mr. WATSON. Yes.

Senator LONG. Or a device. But——

Mr. WATSON. It is a piece of personal property, Senator. You have a monopoly on your necktie, and your coat and all of your personal possessions, and that is the kind of a monopoly a patent is.

Senator LONG. It is a legalized monopoly that is given as a matter of public policy.

Mr. WATSON. Yes.

Senator LONG. And it is a carefully considered monopoly, granting it for a particular purpose. A person has a monopoly if he owns his own home. He has a monopoly to that.

Mr. WATSON. That is right.

Senator LONG. But a monopoly is not always as evil as some people seem to think. There is very little doubt in my mind that even by definition there is a monopolistic aspect to a patent. A man could farm it out if it does have that effect.

Thank you very much, Mr. Watson.

Mr. GORDON. Mr. Watson, could you find out and submit for the record what happened between the 11 months of the President's letter in September 1956, and August 1957 when your task force was actually set up? Can you submit a statement?

Mr. WATSON. I can make a request, but the information was not made available to me or my committee. The Administrator of the General Services Administration may have the answer and all I could do would be to say that the committee is interested and desires to obtain that information and to ask him to supply it, which I will do.

(In response to a question asked by Mr. Gordon concerning the establishment of the Study Group of Government patent policy, the attached documents were subsequently supplied by Mr. Watson:)

EXHIBIT V

GENERAL SERVICES ADMINISTRATION,
FEDERAL SUPPLY SERVICE,
Washington, D.C., December 18, 1959.

Hon. ROBERT C. WATSON,
Commissioner, U.S. Patent Office,
Washington, D.C.

DEAR MR. WATSON: In accordance with our telephone conversation of December 14, there is atached a résumé of the developments between referral to the General Services Administration, by the White House, of the Attorney General's report of November 1956 and formulation of Study Group No. 14 on Patent Policy on August 5, 1957.

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Sincerely yours,

CHARLES W. GASQUE, Jr.,
Assistant Commissioner for Procurement Policy.

RÉSUMÉ OF THE DEVELOPMENTS BETWEEN REFERRAL TO THE GENERAL SERVICES ADMINISTRATION, BY THE WHITE HOUSE, OF THE ATTORNEY GENERAL'S REPORT OF NOVEMBER 1956 AND FORMULATION OF STUDY GROUP NO. 14 ON PATENT POLICY ON AUGUST 5, 1957

In September 1956 the President asked the Administrator of General Services to undertake, in cooperation with the principal procurement agencies, a comprehensive review of procurement policies and procedures. An interagency Task Force was established in October 1956 to facilitate this review.

The patent policy problems of research and development contracts were included in a November 1956 report of the Attorney General, prepared pursuant to the requirements of section 708(e) of the Defense Production Act of 1950, as amended. The report was referred by the White House to GSA in December 1956 for consideration.

The responsibility of the Task Force for review of patent policy problems was subsequently clarified by letter of April 4, 1957, from the Assistant to the President to the Administrator of General Services.

The Task Force then commenced the organization of a Study Group composed of representatives of various departments. The designations were completed and the Study Group was fully organized by August 5, 1957, under the chairmanship of Robert C. Watson.

Mr. ANSBERRY. Mr. Watson, it has been suggested here by another witness that a patent is a matter of constitutional right or, perhaps, in someone's testimony a constitutional privilege.

Of course, we know that patents are mentioned in Article I, section 8 of the Constitution which confers upon Congress the power to establish patents and copyrights.

Do you regard a patent as a matter of constitutional right or privilege?

Mr. WATSON. As a matter of constitutional right or privilege?

Mr. ANSBERRY. Yes.

Mr. WATSON. You mean drawing a distinction between a right and a privilege?

Mr. ANSBERRY. Either/or.

Mr. WATSON. I would say it is a matter of constitutional right. We have no right whatsoever to refuse a patent to a person who has made an invention and complies with the requirements of the law.

Mr. ANSBERRY. Wouldn't you say it is a matter of statutory right under the statutes which establish the means of obtaining a patent, rather than a matter of constitutional right, such as the right to——

Mr. WATSON. Oh, yes. The Congress has the whole patent system in its hands.

Mr. ANSBERRY. It would not have to establish any particular patent system.

Mr. WATSON. And you, for instance, might withhold our appropriations, and the Patent Office, which is the heart of the system, would die, and the system would die. Is that what you mean?

Senator LONG. No. I will ask you a question along the line of the matter that came up yesterday.

The Constitution says that Congress shall have the power to grant patents.

Congress exercised that power by passing a statute——

Mr. WATSON. That is right.

Senator LONG. (continuing). Which conferred a right upon a person to get a patent.

Now, Congress could have done it in any one of many ways. Every time some fellow thought he was entitled to a patent, we could pass an Act of Congress and give him one.

If we passed an act which conferred a right upon any individual who was the first man to think of the idea, to apply and receive a patent for it, it is my conclusion that the right that the individual has is a statutory right because it results from the act of Congress.

Congress has the power to pass the act and did, but the right comes from the statute rather than from the Constitution.

The Constitution gave Congress the power to grant him a patent, and Congress passed an act which conferred the right.

Mr. WATSON. I see for the first time just exactly what you mean, and that is perfectly true.

Now, the Constitution gave to Congress the right to enact a patent law if it so choose. The first one was passed at the request of our first President, George Washington, and he sent a regular message to Congress recommending to the Congress that the Congress pass a Patent Act, and it did.

But if the Congress had not agreed with the President, it would not have passed the act, and we would have had no patent law.

Senator LONG. Well, a nonlawyer attempted to instruct some of us in law yesterday, and I did not agree with his conclusion about the law.

Thank you very much, sir, Mr. Watson.

Mr. WATSON. Thank you.

(The prepared statement of Mr. Watson, together with the attachments follow:)

PREPARED STATEMENT OF ROBERT C. WATSON, COMMISSIONER OF PATENTS, TO THE SUBCOMMITTEE ON MONOPOLY OF THE SENATE SMALL BUSINESS COMMITTEE, AT A HEARING HELD DECEMBER 9, 1959, COMMENTING UPON THE STUDY OF THE PATENT POLICIES OF AGENCIES OF THE FEDERAL GOVERNMENT MADE BY STUDY GROUP 14

This subcommittee has invited me to present to it a statement setting forth the conclusions reached by an interdepartmental committee or study group to which has been assigned the duty of conducting a study of the practices of Federal agencies in dividing patent rights between research and development contractors and those agencies, where the research has been financed by the Government. The work of this study group has not been concluded and no final report can therefore be presented. It is possible, however, to briefly review the work which it has done so far and report any tentative conclusions which it has reached.

The committee, or study group, hereafter called the Study Group, was established in August 1957, upon the request of Mr. Franklin G. Floete, Administrator, General Services Administration. In the letter transmitted by the Administrator the scope of the study to be conducted was set forth in the following terms:

"The mission of this study group will be a reevaluation of existing practices governing the division of patent rights between research and development contractors and the Government, under research financed by the Government, in order to assure that such division is in the public interest."

It was also pointed out in this letter that, in general, the Government's patent policy as presently followed results in the Government obtaining a nonexclusive, royalty-free license to use any patentable inventions arising out of Government-financed research and development work performed by contractors, the contractor obtaining title to patent rights on inventions conceived in the course of performance of the work under the contract.

Attention of the Study Group was also directed to the November 9, 1956, report of the Attorney General which, it was explained, points to the need for greater participation of small business concerns in Government-sponsored

research and development. The attention of the Study Group was also directed to the Final Report of the Select Committee on Small Business of the House of Representatives, 84th Congress, House Resolution 114, House Report No. 2970, and to other expressions of opinion.

The members of the study group initially appointed were John C. Green, Department of Commerce; Ray M. Harris, Department of Defense; Dan E. Weatherly, Jr., Department of the Navy; William G. Colman, National Science Foundation; Julius Renninger, Department of Justice; Eugene J. Davidson, Small Business Administration; and Robert C. Watson, Patent Office. Subsequently representatives of other agencies were added to the group, as will later appear.

An initial move was to contact each agency of Government which employed non-Government organizations to conduct research on its behalf, financed by Government funds, in order to ascertain the nature of the policy which was pursued by that agency in negotiating research and development contracts, particularly its policy with respect to inventions which might be made during the course of the research work.

Replies were received from all of the agencies addressed and, in rough summary, the policies pursued by these agencies with respect to inventions and patents are set forth in the attached memorandum designated "Exhibit A". (See p. 170.)

This memorandum was prepared in the fall of 1957 and does not reflect changes in agency policy which may have been made since then. Those agencies which then required that the contractor transfer to the United States title to inventions made during the course of Government-financed research were found to be Department of Agriculture, Atomic Energy Commission, Department of the Interior, Maritime Administration.

Those agencies which left title in the contractor and required a license to be transferred to the Government were as follows: Civil Aeronautics Administration, Department of Defense, General Services Administration, National Science Foundation, Post Office, Bureau of Standards, Weather Bureau.

Agencies which were found to have policies differing from the policies of those above listed were Department of Health, Education, and Welfare, which required results of research to be made freely available by dedication; the Veterans' Administration, which had a flexible policy resulting in transfer of title to the contractor or to the United States; and Housing and Home Finance Agency, with variable arrangements.

After this information had been collected, the study group determined that, as a matter of policy to guide its future deliberations, it should ascertain, insofar as it was capable of ascertaining, which of the policies pursued by the various agencies had, over the past years during which those policies had been followed, been productive of the most satisfactory results insofar as the interests of the public were concerned. Its views were briefly set down as follows:

"It has been agreed, in order to place the study group in position to intelligently make recommendations looking toward the future, that it should ascertain to the fullest extent possible whether the practices of disposing of patent rights falling within this category by the agencies which have been disposing of such patent rights over the past few years, has been or has not been in the public interest. In other words, certain agencies have been following heretofore a practice which has resulted in the transfer of title to many inventions and patents to the contractor, with license rights reserved to the Government, and other agencies have required title to inventions and patents eventuating from Government-financed research to remain in the Government. The question is: Which practice heretofore followed has actually been most effective in promoting the public interest?"

The study group thus determined that it would be necessary to ascertain, in some manner, facts tending to show the actual effects on the economy of the Nation realized by the past pursuit of the varying policies to which reference has been made. It was determined that authentic information should be obtained directly from industrial and research organizations which had received R. & D. contracts from Government agencies, and particularly from the recipients of title to patents covering inventions developed during such research. The contracting officers of the several agencies were to be consulted, and possibly others. Questionnaires were prepared, the intent being to distribute

these to industrial organizations, to be filled in by representatives of those organizations and returned to the study group for consideration and analysis. It was also believed to be essential by the study group to obtain information by personal visit and interviews.

It finally became clear, however, to all members of the study group that it would be necessary to obtain the assistance of some outside group or organization in order to accomplish in a businesslike and effective manner the distribution of the questionnaires, the development of facts by personal visit, and the careful analysis and evaluation of the facts which were obtained by these means. This was because each of the members of the study group was fully employed in performing other required duties, the group had no staff and funds to support one were not available. Consideration was given to the possibility of securing funds from some governmental source, with the approval of the Bureau of the Budget, for the employment of an outside organization capable of performing the investigative functions thought to be necessary. Representatives of the Bureau of the Budget were consulted and gave their advice, which advice was in confirmation of the views of the study group with respect to the need to employ outside help.

It was ultimately determined, however, by the unanimous vote of the members of the study group, that the Patent, Trademark, & Copyright Foundation of the George Washington University should be consulted to determined whether or not that foundation was equipped to conduct a research study of the type deemed to be necessary. Meetings with the president of the University, who is also the director of the foundation, were arranged, and the subject discussed at length. The University authorities agreed that such a study would be an appropriate one for the foundation to undertake, provided that it could publish the results when the study had been concluded. A definite proposal was drawn up by officials of the foundation and presented to the study group for consideration. The proposal was approved by the study group and it was recommended that the representatives on the study group of the General Services Administration draft a letter of acceptance to be transmitted by General Services Administration to the foundation, a contractual relationship to thus be established. This was done and a definite agreement between General Services Administration and the foundation is in this manner being established. A copy of the proposal forwarded by the foundation to GSA is attached, marked "Exhibit B." (See p. 172.)

The work of the foundation in conducting the study is to commence promptly and it is hoped that it will be concluded with the least possible delay. The extent of the investigation to be conducted is of course limited, funds not being available for a more comprehensive study, but it is hoped that, as a result of the work which will be done under the authorization from General Services Administration much significant information will be obtained and extent of any necessary additional study made clear.

As previously explained, the membership of the study group was augmented during the progress of its work and final meetings were attended by representatives of the following agencies: John C. Green, Department of Commerce; Howard C. H. Williamson (succeeding Ray M. Harris), Department of Defense; Dan E. Weatherly, Jr., Department of the Navy; William G. Colman, National Science Foundation; William J. Lamont (substituting for Julius Renninger, deceased), Department of Justice; Eugene J. Davidson, Small Business Administration; Roland A. Anderson, Atomic Energy Commission; Ralph P. Dunn, Department of the Air Force; T. Hayward Brown, Department of Justice; Capt. Robert A. Fitch (succeeded Captain Robillard, retired), Office of Naval Research; Edward J. Rourke, Department of Health, Education, and Welfare; Gerald D. O'Brien, National Aeronautics and Space Administration. Observers: George G. Mullins, Bureau of the Budget; Messrs. Paul Barron and Phil W. Jordan, General Services Administration.

The study group is still of the opinion that the mission which it is charged to accomplish, i.e., the reevaluation of existing practices governing the division of patent rights between research and development contractors and the Government, can best be accomplished by determining how the pursuit in the past of their several policies, by the various agencies of Government, has resulted. When the findings of the Patent, Trademark & Copyright Foundation have been submitted, they will be promptly given the most careful consideration and such recommendations as would then appear to be appropriate will be transmitted to

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the General Services Administration. Until that time the study group cannot go further in advising the Administration.

(Following are exhibits accompanying Mr. Watson's statement.)

EXHIBIT VI (A)

Memo re patent policy—Government agencies

Subject: Patent policy—Government agencies.

Responses to Commissioner Watson's letters of August 22, 1957, and September 19, 1957, and other oral requests for information concerning Government agency patent policy have been received up to this time, as follows:

COMMENTS OF AGENCY

Agriculture, Department of

Patentable results of research to be made available to the public through dedication, assignment to the Secretary, publication, or such other means as the contracting officer shall determine. Titles to inventions vested in U.S. Government; nearly all patents assigned to Secretary of Agriculture.

Atomic Energy Commission

Basic provisions in atomic energy research and development contracts permit Commission to acquire the rights and interests in all inventions made under the terms of a research contract. Details set forth in chapter 9113 of AEC Manual.

Census, Bureau of the

No present policy; only recently authorized to enter into research contracts.

Civil Aeronautics Administration

Uses patent-rights clause specified in section 9–107(c) of Armed Services Procurement Regulations; CAA Technical Development Center uses a special clause under which the contractor agrees to give a nonexclusive irrevocable license to use any invention resulting from the development work performed under the contract.

Coast and Geodetic Survey

No development contracts (Commissioner Watson's note to file, Aug. 27, 1957).

Defense, Department of

Requires, generally, royalty-free license to Government; contractor retains title to patent and right to collect royalties on commercial production.

Federal Communications Commission

No contracts.

Federal Power Commission

No contracts.

General Services Administration

Letter August 5, 1957, from Mr. Franklin G. Floete, relative to organization of a Government contract patent policy study group, notes present policy as being "in general * * * the Government getting a nonexclusive royalty-free license to use any patentable invention arising out of Government-financed research and development work performed by contractors and the contractor obtaining ownership of patent rights on any invention conceived in the course of performance of the work under the contract."

Government Printing Office

No contracts.

Health, Education, and Welfare, Department of

Results of research, in general, to be made freely available to Government, to science, industry, and the general public.

Housing and Home Finance Agency

Letter October 1, 1957, acknowledges request for report, and indicates statement will be submitted. Report received December 27, 1957, (See p. 4.)

Interior, Department of the

Assignment to Government required, but if not secured then cooperative agreement (1) provides for license to Government and (2) an undertaking to make the invention available to the public through nonexclusive, nondiscriminatory licenses at reasonable royalty rates. Further details in letter September 23, 1957.

Justice, Department of

No acknowledgement of request for report dated August 22, 1957. Report October 24, 1957: no present contracts.

Labor, Department of

Letter, September 26, 1957, indicates Department has no contracts which might give rise to question of patent rights.

Maritime Administration

No specific measures for protection of Government's interest in patent rights prior to activities dealing with creation of a nuclear-powered cargo vessel. In the field of nuclear applications, protective clauses now used by AEC have been incorporated into contracts. General Counsel's office examines each contract relating to research and development and adheres to the general policy that the Government should receive full benefit from any patent rights stemming directly from research financed by Maritime Administration.

National Science Foundation

Domestic rights may be protected by institution doing research work, with a royalty-free, nonexclusive license to the Government; NSF reserves right to determine disposition of foreign rights

Post Office Department

In general, follows patent provisions contained in Armed Services Procurement Regulations, with certain exceptions. Exceptions specified in letter of October 17, 1957.

Public Roads, Bureau of

No definite policy with respect to division of patent rights between Government and contractor.

Standards, Bureau of

NBS obtains an option to purchase a license for inventions made by contractor before entering into contract; Government obtains an irrevocable royalty-free license on inventions developed under contract; and, an assignment as to those inventions for which patent applications are not filed by contractor.

State, Department of

No contracts.

Tennessee Valley Authority

No outside contracts. Employees do research in fertilizer field.

Treasury Department

No contracts.

Veterans' Administration

Contractor decides which of two alternate articles shall be included in research and development contract. So-called short form calls for outright assignment to Government; long form provides that Government shall have irrevocable, nonexclusive, nontransferable and royalty-free license, with a variety of details.

Weather Bureau

No research work involving mechanical devices; existing contracting procedures stipulate that Government shall have nonexclusive license to manufacture or cause to be manufactured any invention for its own use.

Housing and Home Finance Agency

Research contracts authorized under several laws administered by Agency; generally, results of research are required to be made available to the public though dedication, assignment to the Government, etc., but in one instance contracts contain no provision for division of patent rights between the public and the Government.

Constituent agencies, FHA, Public Housing Administration, etc., either negotiate contracts containing no provision for division of patent rights, or have no contracts involving research by contractors.

EXHIBIT VI (B)

NOVEMBER 23, 1959.

MR. FRANKLIN G. FLOETE,
Administrator,
General Services Administration,
Washington, D.C.

DEAR MR. FLOETE: Following discussions of some months, I have been asked to submit a proposal under which the George Washington University would undertake, through its Patent, Trademark, and Copyright Foundation, to make a study on the subject of Federal patent policies in connection with Government-financed research and development contracts.

This study has been recommended by Commissioner Robert C. Watson, of the U.S. Patent Office, and by the Interagency Study Group of which he is Chairman. As I unerstand it, that study group was established by you as a result of an assignment by the White House to the Feneral Services Administration for study of the November 1956 report of the Attorney General to the President and Congress concerning Government contract patent policies. The Attorney General's report dealt with the possible tendency of some of these patent polices to contribute to economic concentrations in industry.

As a result of discussion with Commisioner Watson and members of his study group, as representatives of GSA associated with the Interagency Task Force, of which the study group is an adjunct, we have developed the attached proposal dated August 5, 1959.

You will note that the research proposal contemplates a study which is somewhat broader than the more specific question posed by the Attorney General. This was based upon the conclusion of the study group that the narrower question should be considered in a somewhat broader perspective, as reflected in our research proposal.

As you know from other studies which have been performed for the Government and for GSA, we do not attempt to spell out every detail in our proposal, and we depend, as does the Government, on informal meetings at the inception of and during the course of the performance of the research to work out details.

The Foundation follows the practice of publishing reports of its projects in the Foundation's Journal to which a copyright automatically applies upon publication. It is my understanding that you have no objection to our following this practice in connection with this study so long as the Government is given, without limitation, complete right to publish, have published, or authorize publication of this study. Accordingly, the Government's right so to do is made a part of this proposal.

The university understands that this proposal is subject to the provisions of the standard Government contract clauses relating to contingent fees (FPR 1–1.503); nondiscrimination in employment (FPR 1–7.001–18); examination of records (FPR 1–7.101–10); officials not to benefit (FPR 1–7.101–19); convict labor (FPR 1–7.101–15); and disputes (FPR 1–7.101–12).

The George Washington University represents that it has not employed or retained any company or person other than a full time bona fide employee, working solely for the George Washington University, to solicit or secure this contract; that it it has not paid or agreed to pay any company or person other than the full time bona fide employee, working solely for the George Washington University, any fee, commission, percentage, or brokerage fee contingent upon or resulting from the award of this contract; and agrees to furnish information relating to the subject matter as requested by the Government.

This proposal, including the cost estimate on which the contract price of $28,283.50 is based, has been prepared consistent with the university's standard

practices in connection with performance of Government-financed research work. It is understood that payments will be made in equal monthly payments as the study progresses.

Very truly yours,

———— ————,

President, the George Washington University.

AUGUST 5, 1959.

RESEARCH PROPOSAL

Name and address of institution: The Patent, Trademark, and Copyright Foundation of the George Washington University, Washington, D.C.

Name of principal investigator: Dr. Donald Stevenson Watson.

Title of proposal: Federal patent policies in contracts for research and development.

Description of proposed research.

THE PROBLEM

Within the many circles, both public and private, that are concerned with the operation of the patent system, there has arisen the question as to whether the public interest is best served by the several patent policies now being followed by federal agencies contracting for R. & D.

The foundation has the facilities and the disinterested position to conduct research leading to answers to the problem. As the foundation now sees it, the problem is to examine the implications of Federal patent policies and to evaluate them in the light of a carefully specified concept of the public interest.

The Patent, Trademark, and Copyright Foundation of the George Washington University is the only university organization that is dedicated to a systematic empirical study of the role of the American patent system, including trademarks and copyrights.[1]

The foundation approaches its task of appraising our patent system from many directions with a research staff of different skills and interests. The staff includes economists, psychologists, lawyers specializing in patent matters and other professional people[2] who participate in the planning and general conduct of the foundation's research. All research plans are formulated in conformity with policies agreed upon by the Advisory Council (see pp. 9–10 of the bulletin) and subject to the general guidance of the director and the executive director. The latter devotes all his time to the work of the foundation with the aid of a full-time staff of six (see bulletin) and a varying number of part-time student help. As in the case of many other studies for which the foundation office serves as a base, the executive director is not only available for administrative duties connected with the study but also for guidance and advice on the legal aspects. A few members of the research staff not specifically connected with the study may be asked occasionally for opinions and suggestions on various aspects in which they have special competence.

THE SETTING OF THE PROBLEM

The foundation proposes to analyze the problem in the period since 1950. The problem must be placed in its larger setting, so that among other things a framework for economic analysis can be erected.

The setting of the problem is the growth of Federal-financed R. & D. This is to be analyzed by industry, by product, by agency, and by patent policy. This part of the analysis will show what industries and what products have been covered by the various patent policies. The material which has already been gathered by the Commissioner of Patents as Chairman of the Patent Policy Study Group (No. 14) (established in connection with the Interagency Procurement Task Force), as well as other Government reports or publications, will be fully utilized.

The study will be limited to certain aspects of three topics: (1) Implications of patent policies for contractors, (2) for Government agencies, and (3) for the public interest.

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[1] "The Research Program of the Patent, Trademark, and Copyright Foundation," the Patent, Trademark, and Copyright Journal of Research and Education, vol. 1, No. 2, December 1957, pp. 175–184. See also art. III of the declaration of trust (copy enclosed).

[2] See the Patent, Trademark, and Copyright Foundation, the George Washington University, "Bulletin 1959–60" (copy enclosed).

THE IMPLICATIONS OF THE POLICIES FOR CONTRACTORS

The Commissioner of Patents and Study Group 14 have developed a questionnaire whose purpose is to yield data on the effects of the several patent policies on contractors. The foundation proposes to utilize the experience of Study Group 14 and develop, for this study, a new questionnaire after interviews with selected contractors. The new questionnaire, after discussion with designated Government representatives, can be sent to a scientifically chosen small sample of contractors and, perhaps, others. The information elicited should permit provisional answers to questions such as these: How do the different patent policies affect incentives of contractors? What has been the flow of commercially valuable patented inventions under each of the major policies? What benefits have contractors received, and in what ways have the benefits been disseminated to other concerns, the Government, the public, etc.?

THE IMPLICATIONS OF THE POLICIES FOR GOVERNMENT AGENCIES

This part of the research project will explore the bases and the reasons for the different patent policies followed by different agencies. Some of the consequences of the policies will also be explored. What uses are made of the patent rights held by the Federal Government?

How do the policies impinge upon the ease and costs of procurement, etc.? To the extent feasible this study will develop pertinent factual data and appropriate analyses of such data.

THE PUBLIC INTEREST

At this time, the foundation can only sketch the broad outlines of a tentative opinion of the relevant concept of the public interest.

The public interest is many faceted. It can be visualized as a group of ends to which patent policies are the means.

Among the ends are (1) the progress of science and the useful arts; (2) the strengthening of the national security; (3) the stimulation of economic growth through gains in productivity; and (4) the preservation of a free and healthy economic structure. These are among the general goals of government, goals whose attainment is affected by patent policy. Besides these, each major Federal agency attempts to pursue its own public-interest complex. Each of these complexes differs a little from the others, if only in emphasis. Ideally, an agency's patent policy should serve both the particular ends of the agency as well as the general ends of national policy.

The foundation anticipates that this study will also yield results that will show the way to a full and more definitive study should that prove desirable or necessary.

Personnel

The principal investigator, Dr. Donald S. Watson, is a professor of economics and executive officer of the Department of Economics of the George Washington University. He is co-author of a widely used text, "Modern Economics," and author of a forthcoming book, "Economic Policy." He has had extensive consulting experience with Government and private agencies.

The associate investigator, Dr. Harold F. Bright, is professor of statistics and executive officer of the Department of Statistics of the George Washington University. He has taught mathmetics and statistics at San Angelo College, Denison University, Trinity College, the University of Rochester, and the University of Texas. He was deputy director of the human resources research office which operates under a contract between the Department of the Army and the George Washington University. He also served as specialist, operations research and synthesis, the General Electric Co., Plainville, Conn. Dr. Bright has contributed articles to technical journals.

Cost of project

The subject matter of this proposal will be completed in approximately 1 year after the date of the signing of the contract. The total cost of this project shall be $28,283.50. Attached is proposed budget for the study which is set forth to substantiate the reasonableness of this figure. Said sum shall be paid in equal monthly installments, the first of which shall be due on the 30th day after the date of signing of the contract for the project.

EXHIBIT VI (C)

Proposed budget for study on "Federal Patent Policies in Contracts For Research and Development"

[Time: 8 months to a year]

	Per annum
Salaries:	
Dr. Donald S. Watson, principal investigator, (equivalent to 5 days per month)	$3,000.00
Dr. Harold F. Bright, associate investigator, (equivalent to 3 days per month)	2,000.00
Research associate—graduate student (law)	3,500.00
Statistical assistant	3,250.00
Correspondence assistant	3,250.00
Secretary-clerical-typist (1)	3,250.00
Total salaries for 1 year	18,250.00
Operating expenses:	
Travel	$2,000.00
Office expense	500.00
Mimeographing and postage [1]	250.00
Other communication	250.00
Processing of forms	500.00
Total, 1 year operating expenses	3,500.00
Direct expenses: Total per annum	21,750.00
Indirect expenses: 35.8 percent overhead (35.8 percent of salaries)	6,533.50
Grand total	28,283.50

[1] Does not include cost of printing copies of the report.

Senator LONG. Dr. Alan T. Waterman, please. Is Dr. Waterman here?

Will you proceed, Dr. Waterman?

Would you prefer to read your statement, Dr. Waterman, or just summarize it?

STATEMENT OF DR. ALAN T. WATERMAN, DIRECTOR, NATIONAL SCIENCE FOUNDATION; ACCOMPANIED BY WILLIAM J. HOFF, GENERAL COUNSEL; AND CHARLES B. RUTTENBERG, DEPUTY GENERAL COUNSEL

Dr. WATERMAN. I believe, sir, that since it is a short statement, the position could be stated very clearly and concisely by just reading it, if that is satisfactory.

Senator LONG. Fine. Would you just read it?

Dr. WATERMAN. Mr. Chairman and members of the subcommittee, I am happy to meet with you today to discuss the patent policies of the National Science Foundation.

The statutory basis for the patent activities of the Foundation is contained in section 12 of the National Science Foundation Act of 1950, as amended. Section 12 is a general provision which directs the Foundation to establish patent policies in a manner calculated to protect both the public interest and the equities of the individual or organization with which the Foundation has contractual or other arrangements relating to scientific research. As you can see, this is a broad charter. In enacting this section the Congress indicated that because basic research seldom develops patentable processes, special patent pro-

visions were unnecessary. After careful consideration of the problem, the Foundation established a policy whereby Foundation grantees are permitted to retain rights to inventions developed during the course of Foundation-supported research but are required to give the Government a royalty-free, nonexclusive license to use the invention for governmental purposes. Until a year or so ago this policy related only to domestic patent rights; up to that time the Foundation reserved the right to determine disposition of foreign rights. I will discuss the reasons for the change with respect to foreign rights later.

I would like to point out that very few of the Foundation's arrangements for support of scientific research are with profit organizations and these are made only under exceptional circumstances. Thus the Foundation is rarely concerned with the matter of technical information, know-how, specialized processes or other proprietary rights which might be put to commercial use. The overwhelming proportion of the Foundation's arrangements is in support of basic research and is with educational institutions. Normally, basic research results in the publishing in a recognized mathematical or scientific journal of an article describing the work and conclusions drawn from it. In fact, it is the recognition by the scientific community of the importance of the work which motivates the basic research worker and not its practical use. The National Science Foundation has as one of its primary purposes the fostering of the interchange of scientific information among scientists in the United States and foreign countries. You can see, therefore, that the National Science Foundation and educational institutions have a common purpose in this regard. Both are concerned that full information with respect to the results of scientific research be made pubicly available as soon as possible.

The nature of basic research is such that the possibility of patentable inventions resulting during the conduct of such research is very limited. It has been stated from time to time in judicial decisions relating to patent matters that a conception of the mind not represented in some physical form is not an invention within the meaning of the patent laws and that patents are not granted on discoveries of abstract laws or principles but can be awarded only with respect to the embodiment of a concrete idea, whether such embodiment is a device, a product or a process. Since basic research is concerned primarily with the study of natural phenomena and the ascertainment of natural laws and principles, the prospects of patents arising from such research are not very substantial, particularly of patents having commercial value. In this connection, for example, it is interesting to note that since the creation of the Foundation in 1950, the Foundation has been notified of only about 15 inventions on which applications for patents have been filed as a result of research conducted under a Foundation grant or fellowship.

On rare occasions, however, work carried out under a grant or contract for basic research does lead to a patentable invention. Universities, of course, use income derived by them from inventions to further their research and educational purposes. A number of them have arrangements with a nonprofit organization, the Research Corp., which distributes its net income to colleges and universities as a grants-in-aid of fundamental research. Under these arrangements,

the Research Corp. acquires from the institution inventions which appear to have commercial prospects. The Research Corp. bears all the costs incidental to patent processing and licensing of patents on such inventions. Income from such patents is divided among the institution, the inventor and the Research Corp. The institution's share is, of course, devoted to research and educational purposes. The corporation's share, after deduction of expenses, is applied to sponsoring further basic scientific research. Included among the numerous educational institutions with which the Research Corp. has agreements, are Harvard, Yale, the Massachusetts Institute of Technology, the University of Pennsylvania, New York University, and other leading institutions of higher learning. In fiscal year 1958, the Research Corp. awarded colleges and universities about $1.2 million as grants-in-aid of fundamental research. In point of fact, therefore, the income received from patents developed during the course of research supported by the National Science Foundation would generally go back into scientific research or be used for other educational purposes.

As I indicated previously, the Foundation's earlier policy had been to retain the right to determine disposition of foreign patent rights. However, as inquiries among Federal agencies following notification of the possibility of acquisition of such rights in no case resulted in an expression of interest that the Federal Government retain such patent rights, the inventor was allowed in each case to apply for the foreign patent. Various reasons undoubtedly existed for this result, an important one being the cost of prosecuting the application for the foreign patent. The Foundation, in the light of this experience, subsequently altered its policy so that our policy with respect to foreign rights is now the same as with respect to domestic rights, namely that the Government receives a nonexclusive, royalty-free license to use the invention for governmental purposes. A similar result occurred in the rare instances where National Science Foundation fellows developed inventions during their tenure. Until last year the Foundation reserved the right to determine disposition of all patent rights on such inventions. However, in the three cases which occurred, inquiry of the appropriate Federal agencies elicited no interest in having the Government apply for the patent. In each case, therefore, the fellow was permitted to retain the right, subject to giving the Government a royalty-free, nonexclusive license. In the light of this experience over 8 years, the Foundation's patent policy with respect to persons on Foundation fellowships was then brought into line with that on grants, namely, allowing the fellow to keep the rights subject to a license to the Government.

So far I have been talking primarily about the Foundation's arrangements with educational institutions and with Foundation fellows. As I mentioned to you earlier, very few of the Foundation's arrangements for support of scientific research are with profit organizations, and such arrangements are made only where unusual circumstances require the particular competence or facilities of the company involved. Since the establishment of the Foundation in 1950 approximately eight contracts have been entered into with commercial organizations for support of basic scientific research. About four of these contracts are currently active. Two of the four organizations involved in the currently active contracts have 20 employees

or less. The third had less than 500 employees during 1958 when the Foundation's contract was executed although we understand that it now has considerably more employees. The fourth is a large organization. The total value of all these four commercial contracts is less than $300,000. When we consider that the Foundation's budget for fiscal year 1960 is aproximately $153 million, you can readily see that this is an insignificant portion of our research activity. The Foundation will always, however, give careful consideration to protecting the needs of the Government adequately in connection with arrangements with profit organizations where possible exploitation of inventions developed under such contracts might be involved. To date, the Foundation has not been notified of any patents having been applied for by any of the commercial organizations with which the Foundation has contracted for support of basic scientific research, although, such notification has been required under the terms of each contract.

As you know, the question of Government patent policy, generally, has been studied and restudied many times and is an extremely complicated matter. The Foundation's policy has been adopted to take into account the particular nature of the Foundation's operations and the fact that our statutory authority states that one of the objectives of the Foundation is to strengthen basic research and education in the sciences throughout the United States.

This concludes my statement, Mr. Chairman, and I would be glad to answer any questions.

May I just say that, perhaps there is a remark or two in interpretation of what I have said that might be in order.

First is to be sure that we understand what we mean by basic research, which is the Foundation's major job.

Basic research, by the definition of which we use in collecting information about research and development throughout the country and in the Federal Government, is that type of research where the primary objective of the researcher is to secure better knowledge and understanding of the subject he is investigating, such as natural phenomena, as a rule, rather than any practical use of the subject under study.

I might, as I have before, give the following illustration. If a research man is studying a virus from the standpoint of determining what the virus is, what its habits are, what it does, and its term of life and so forth, that is surely basic research.

If he finds in the process that the virus does certain things that harm mankind, then he is at the threshold of applied research.

If his research is an attempt to kill the virus or curb it or otherwise stop these harmful effects, this becomes applied research, not basic.

I say this because there is a popular conception of another use of the term "basic research," frequently in industry, where basic research quite naturally is expected to be research basic to the interests of the company, but that is not the way in which we have defined it for the Government, and which the Government agencies use in their definition.

The Foundation does not, as you know, operate any laboratories. This is forbidden by its statute, nor does it perform any scientific research by its own personnel.

Senator LONG. Do I understand you correctly that the National Science Foundation is dealing in basic research and not applied research?

Dr. WATERMAN. Yes, sir. The main place where we may support applied research, stems from the special authority granted us in 1958 in the field of weather modification research, but, in general, as we are handling that legislation, we would expect to do this by calling on one of the other agencies to do it if it became applied.

Senator LONG. If you were to succeed in the field of weather modification, that could be of absolutely enormous significance and value, could it not?

Dr. WATERMAN. It might be, yes. So far, the major problem in weather modification is that we have got to have a better understanding—we have tried applied research and we have not found anything important that can be done—so this puts it back into basic research, and the result is that any inventions coming out of it now would probably be basic research devices useful only to the research group involved and not of general commercial use. It is in that stage at the present time.

Senator LONG. Yes.

How much is your annual budget for this research?

Dr. WATERMAN. We have explicitly about $2 million for this purpose, and then this shades off into the study of basic research in the atmospheric sciences where we have about $3 million more.

Senator LONG. I would just wonder whether you are in any way impeding yourself to finding an answer in the field of weather modification by trying to stick to basic research or rather than going ahead and trying to—not worry much about where the dividing line is between basic and applied research.

Do you feel that the funds you have there—it does not matter whether it is basic or applied?

Dr. WATERMAN. Yes, indeed. This is a very urgent problem, as we know, so we are trying to do it by the most intelligent means possible.

But, you see, according to the agreement we have with other agencies, we expect them to participate, too, so that our money can be transferred to them, and they often are more competent to handle the applied research aspects.

But we would leave no stone unturned here and, of course, there is not a sharp boundary actually between basic and applied. You just use your wits, and if you find by a direct approach to find the answer to a problem that you run into a stone wall, you have to go back and have a better understanding of the whole thing before you know how best to proceed.

This is a matter of ingenuity here, of the most intelligent approach.

You see in basic research, a man's reputation, his standing and his position depend on his output of research papers, the knowledge contained in them. That is his goal, his motivation.

If you went around to universities and talked to the people doing basic research and asked them, "What about your patents," I think they would look at you with some astonishment and say, "This is basic research. We don't care about patents. We want to know about the basic understanding of what we are studying."

Senator LONG. It does seem sort of an anomaly though that to do basic research it would require the same sort of mentality, I

should imagine, and to a considerable degree the same abilities that a person would have in order to do applied research, and yet there are such tremendous rewards in the patent field for applied research which do not exist in the field of basic research, according to your definition.

Do you feel that there is adequate talent to do this basic research even though there are these tremendous incentives over the field of applied research?

Dr. WATERMAN. That is a troublesome question because the word "adequate" is a little hard to define.

At the present time we do know there are many more competent people that could do very good basic research, but there are not funds enough to go around to support them in the way that they should be.

The applied research people tend to get a quicker response because people can see what it is they are driving at.

There is a need both for supporting more people in basic research now because they are available—and we are getting applications from them all the time that we cannot meet—good research too—and also for developing more basic research people. That goes back to the fact that we are in a very highly competitive situation right now in this country, and what we do in the way of applications and development rests primarily on what is discovered in basic research.

We do not dare ignore that field—and it is not a costly one to develop—because here is where ideas come from, and the new data to keep our developments up to date. So it is very important that we back that strongly. If we want to economize, most of the money is on the developmental side. We should be very careful at what we choose to develop because we waste more money in a premature development than most ways I know. That is where the basic research helps.

Senator LONG. It is my impression, Dr. Waterman, that the greatest, perhaps the greatest, difficulty in finding a cure for leprosy, of which about 8 million people on this planet suffer, is because science has not been able to make that germ live in any other animal besides the human being, so they have not been able—is that a problem of basic or applied research?

Dr. WATERMAN. This goes back to the motivation of the man doing it.

If he, in his work, is trying to cure the disease of leprosy, then I would say everything he is doing is applied research because he is motivated that way.

If, on the other hand, his research is in biology leading to an interesting field where something is happening that he does not understand, and he gets into a field involving leprosy, and then studies that with a view of finding out, getting an understanding of, what nature is doing here and what the nature of the disease is, then that is really basic.

The borderline is not hard and fast, but I think you can see the difference.

Take an explorer in a region of an unexplored country, with five different obvious approaches to go back into the interior.

The basic research man would look them over impartially and decide on one where he might find something important. He takes that one

and studies it carefully, and whatever he finds he reports, whether it may be something of practical interest or not. He really is interested in finding something new, that is all.

Another man comes along and he would like to find the best approach to where one can get coal or fuel, so he looks over the territory with an idea of where he might find coal, and then he takes that route.

In his case he is much more apt to find coal, perhaps, but, on the other hand, he is blind to the other possibilities.

So there are merits to both sides.

My point is that public support would generally go to the man trying to find coal and not the other. Yet the whole of science shows that the most important, highly revolutionary discoveries such as X-rays, come from people who are just looking to find what is there. They cannot look for X-rays until we have discovered it, you see, so it has to appear to a person looking in on the frontier with that motivation to find them. Perhaps that, by analogy, illustrates it.

Senator LONG. Would you say that the sulfa drug resulted from basic research or would it be as the result of applied research?

Dr. WATERMAN. I do not recall the history of that clearly and, of course, I am not a biologist by profession, but as a rule such things are discovered by basic research.

The man who discovers it may not even see the application. Then someone else sees it and picks it up and thereafter it becomes applied research. A good illustration is penicillin.

This was discovered as a matter of basic research, just by the keenness of perception of Fleming, when he saw that ordinary mold seemed to keep bacteria out of that region. That was just the observation. Now, he was not trying to cure the things that penicillin cures. He just made the observation that bacteria avoided the mold he found on materials he was using. That was fundamental research.

Now after this was discovered, of course, one could see the application. This was picked up and applied research undertaken to find what kind of a mold is required, what can it do, what kind of bacteria it will handle, and then ultimately its use with animals and with human beings.

So the start of the chain is usually basic research.

Senator LONG. Thank you, that is all.

Mr. GORDON. You stated that the results of your weather modification basic research could be patentable; is that correct?

Dr. WATERMAN. The results? Not if they are in the form of papers, which they usually are, when it is basic.

Mr. GORDON. With respect to weather modification, if anything practical is demonstrated in the ability to modify rainfall, it could be patentable, couldn't it?

Dr. WATERMAN. As I understand the meaning of this, it would have to be an instrument useful to a process or some process that was tangible. You could not patent an idea.

Mr. GORDON. As I understand it, many important discoveries have come out of basic research. I understand that antibotics, and the mycins which were patentable, came out of basic research. Is that correct?

Dr. WATERMAN. I just spoke about the discovery of penicillin, which was the first of the antibotics, that was first basic and then picked up by applied.

Mr. GORDON. Would you say that one of the main objectives of the Foundation is that full information of Foundation-sponsored research be published as soon as possible?

Dr. WATERMAN. Well, rather than as soon as possible, as soon as feasible.

One does not rush to print in a hurry to do it tomorrow, but as soon as it is feasible. The scientists want this, of course. They do not use the word "patents" but they have a feeling of their own about what they are doing. They want this to be published as soon as possible, so that they will get credit for having made the contribution to research; thus there should be every attempt to get this out fast.

Mr. GORDON. Do you require it in your grants or contracts?

Dr. WATERMAN. Do we require grants or publication?

Mr. GORDON. Do you require prompt publication or prompt delivery to you of information——

Dr. WATERMAN. This is expected. We require a report to us.

We do not require, as a hard and fast rule, publication in scientific periodicals. This is a hard thing to do because these scientific periodicals are selective.

If the work is not up to standard they will not publish it. So, you see, you cannot very well make the requirement. But, in general, our standard of research is very high and it is all published.

Mr. GORDON. There appears to be nothing in the grant or contract, and I have a copy of it right here, to force this to be done, that is, that Foundation-sponsored research be published or given to you as soon as possible.

How is this objective, then, to be attained?

Dr. WATERMAN. The whole scientific fraternity is anxious to publish the results of what it does at the earliest possible moment. There needs to be no requirement there.

If we were to put in a requirement, as I say, there would be trouble, because some work just does not pan out. If the publications where the scientists want to publish, which are the ones where their colleagues will see it, where it will do benefit to the scientific community, will not publish it, then there is not much point in doing so because the quality is not high.

We do not see any reason why this should be required because they all want to do it anyway, and we always have a report ourselves.

If on getting the report in, we felt that this was important to bring out in some way, this we do. But some contributions are just not valuable enough to publish. And basic research being what it is, you cannot know that in advance.

Mr. GORDON. But some contributions could be valuable and could be patentable?

Dr. WATERMAN. Not papers, no.

Mr. GORDON. Pardon me?

Dr. WATERMAN. Not papers, no.

You were speaking about the publication of results. As I say basic research is practically entirely published papers, descriptions of the work, not devices.

Mr. GORDON. I know. But how about the new scientific knowledge that has been acquired as the result of research?

Dr. WATERMAN. We all want that published as fast as possible, including the man himself who does it.

Mr. GORDON. But there is nothing in the contract which makes him do it. How are you going to get him to do it? Suppose he sees there is something either patentable or will lead to patentable inventions. Suppose he decides he wants to hold back on it? What is going to prevent him from doing that?

Dr. WATERMAN. I just do not see that the question applies since the main thing basic research people want to do is publish what they do.

Sometimes what they do does not pan out. It is just they made a mistake. It did not turn out anything valuable.

In that case why should you require that they publish it? It is like passing a law to make a person eat food each day.

The universities want research published for their own reputation, the man wants to publish, and, besides, there is not here a contract we make. Besides there are grants, so I do not see how we could put in a requirement here.

Mr. GORDON. Well, is it not possible to put in a requirement that if you grant money you get something in return in the form of new knowledge?

Dr. WATERMAN. I will tell you if we did this as a scientific foundation and speaking as a scientist personally, the research fraternity and the universities would laugh at us.

Mr. GORDON. I do not mean to require something in return that way. What I mean is if something is developed or if certain scientific knowledge is secured.

Dr. WATERMAN. You mean a patentable device?

Mr. GORDON. Whether it is patentable or not. Perhaps the new knowledge could lead to a patent. You do have contracts with private concerns, do you not?

Dr. WATERMAN. They are almost entirely private concerns in the sense of educational institutions.

Mr. GORDON. And four business concerns, as I understand it?

Dr. WATERMAN. Only four out of the thousands we have made, thousands.

Let me illustrate and perhaps this will straighten this point out for you.

We do have a grant which I will illustrate here, for the design and construction of new laboratory equipment which does involve the possibility of developing devices, such as laboratory experimental equipment which could be patented—I will read you the conditions that we require in this grant to show you how we handle this particular situation:

> The objective of this is to develop new laboratory demonstrations for college physics classes, the subject physics, and to publish them in a manual containing about 100 experiments appropriate both to small colleges and large universities.
>
> Full information on the construction and use of the equipment will be made readily available to teachers, educational institutions, equipment manufacturers, and other interested individuals and organizations through articles in professional journals, reports, drawings, talks, or exhibits at scientific meetings or other appropriate channels.
>
> It shall be the responsibility of the grantee to make application for such foreign and domestic patents for equipment conceived and developed under this grant as may be deemed appropriate.
>
> The grantee shall notify the Foundation of any application for such a patent, and shall give the U.S. Government a royalty-free nonexclusive license to use the invention for governmental purposes.

In the case of equipment for which patent application is made, arrangements for the commercial production should be such as to permit the widest possible number of appropriate and interested concerns to submit proposals for production and distribution of the equipment.

Selection of manufacturers and distributors shall be made so as to assure the widest distribution at the most reasonable price.

Any profits or royalties received by the grantee from the sale of equipment shall be used for purposes agreed upon by the Foundation and the grantee.

That is the condition we set up in those grants.

Mr. GORDON. Grants to a private contractor?

Dr. WATERMAN. One is to a university. One, I think, is to a scientific society; but they are all to organizations that have high competence in devising experiments of this sort, whether they are teachers or research people in physics.

Mr. GORDON. On page 2 of your contract provision D(b), it states that the Government can get scientific information only when it is already copyrighted or it is planned to do so.

Suppose that a contractor wants to keep it a secret and not copyright it. There is no provision making it mandatory to deliver to the Government technical knowledge and data acquired with Government funds, is there?

Dr. WATERMAN. I'm not sure just what you're referring to. As a general policy——

Mr. GORDON. Well, this is what it says:

* * * With respect to the subject data now or hereafter covered by copyright and not originated in the performance of this contract, such license shall be only to the extent that the contractor——

That is section D(b) of the contract. I have it right here in front of me.

Dr. WATERMAN. This is one of our contracts?

Mr. RUTTENBERG. Which contract is this, sir?

Mr. GORDON. This is NSF–C.

Mr. RUTTENBERG. There is a number after the "C", I believe.

Mr. GORDON. There is no number.

Mr. RUTTENBERG. Just a sample form?

Mr. GORDON. Just a sample form.

Mr. RUTTENBERG. D(2)?

Mr. GORDON. There are no numbers. "Rights to data," article D, section (b).

Dr. WATERMAN. I think counsel, Mr. Ruttenberg, could answer this question.

Mr. RUTTENBERG. Are you talking about the right to reproduce now, is that the heading?

Mr. GORDON. This says rights to data, article D. This is what you supplied me, and it says:

The contractor agrees to and does hereby grant to the Government, and to its officers, agents, and employees acting within the scope of their official duties, a royalty-free, nonexclusive and irrevocable license throughout the world for Government purposes to publish, translate, reproduce, deliver, perform, dispose of, and to authorize others so to do, all subject data now or hereafter covered by copyright.

What does that mean?

Mr. RUTTENBERG. What you may have there is a contract that we have used in connection with the translation of scientific literature. I am not sure that that is one of our research contracts that you have.

Let me check one more here to see——

Mr. GORDON. This, incidentally, concerns weather modification, a very important problem.

Mr. RUTTENBERG. I do not see that clause in the contract before me. Could I take a look at it?

Dr. WATERMAN. If we could indentify the passage perhaps we could answer you better.

Mr. GORDON. Dr. Waterman, in the interest of time, could you supply the answer to this question for the record?

Mr. RUTTENBERG. Yes, indeed.

Mr. GORDON. The provision states that the Government gets data only when it is copyrighted or it is planned to copyright it.

Mr. RUTTENBERG. I think the answer to that may be that it was in the draft and was not in the final executed contract. I do not know.

(Following is information subsequently supplied by Mr. Ruttenberg:)

EXHIBIT VII

"RIGHTS TO DATA" ARTICLE IN NATIONAL SCIENCE FOUNDATION CONTRACTS

The language in question appears in section (b) of the "Rights of Data" article of the two most recent contracts for support of basic research entered into with profitmaking organizations by the National Science Foundation. Section (b) states that, in the event any of the "subject data" produced under the contract is covered by a copyright, the Government will receive a royalty-free, nonexclusive and irrevocable license throughout the world for Government purposes, to publish translate, reproduce, deliver, perform, dispose of, and to authorize others to so do, all such material. Section (a) of the "Rights to Data" article defines "subject data" as all data specified to be delivered under the contract, whether or not copyrighted.

Article 1 of each of the two contracts in question, entitled "Scope of Work," specifically provides for the collection of data by the contractor and requires that all such data be submitted to the Naitonal Science Foundation. Whether or not it is copyrighted, therefore, the Government receives data developed under the contracts. Section (b) of the "Rights to Data" article is designed to provide further protection to the Government with respect to information produced under the contracts and is not intended in any way to lessen the amount of information received.

The two contracts in question are for support of research in the field of weather modification. Legislation enacted by the Congress in 1958 authorizing the Foundation to initiate and support a program of study, research and evaluation in the field of weather modification specifically provides:

"The Director of the Foundation may obtain by regulation, subpena, or otherwise such information in the form of testimony, books, records, or other writings, may require the keeping of and furnishing such reports and records, and may make such inspections of the books, records, and other writings and premises or property of any person or persons as may be deemed necessary or appropriate by him to carry out the provisions of such paragraph (9), but this authority shall not be exercised if adequate and authoritative data are available from any Federal agency" [42 U.S.C. 1861, 1872a(f)(1)].

In addition, subsection 4 of 42 U.S.C. 1872a(f) states:

"Information contained in any statement, report, record, or other document furnished pursuant to this subsection shall be available for public inspection, except (A) information authorized or required by statute to be withheld and (B) information classified in accordance with laws to protect the national security. The foregoing sentence shall not be interpreted to authorize or require the publication, divulging, or disclosure of any information described in section 1905 of title 18 of the United States Code, except that the Director may disclose information described in such section 1905, furnished pursuant to this subsection, whenever he determines that the withholding thereof would be contrary to the purposes of this section and section 3(a)(9) of this Act."

It is clear, therefore, that, in connection with the activities of the Foundation in the field of weather modification research, any data improperly withheld can be obtained by the Foundation through appropriate legal measures.

Mr. GORDON. Suppose the contractor wants to keep it a secret and not copyright it, does that mean we do not get the information?

Mr. RUTTENBERG. We can check that and let you know.

Mr. GORDON. How do you know if any inventions or patents result from your grants or contracts or how do you keep yourself informed about the number and kind of discoveries resulting from the grants and contracts, if it is not in the contract itself?

Mr. RUTTENBERG. May I answer that?

Each contract that we execute for support of research has a provision which says that the contractor must notify the Foundation within a reasonable time of any application for a patent.

In addition, the grantee is supposed to notify the Foundation about any patents received as a result of research work sponsored by the Foundation.

In other words, both the contract and the grant have a provision requiring notification.

Mr. GORDON. When did you put that provision in? It was not in your contracts a year ago, was it?

Mr. RUTTENBERG. I believe it has been in there all the time.

Mr. GORDON. Has it been in there all the time?

Mr. RUTTENBERG. Yes, I'm quite certain we have had that from the beginning.

Dr. WATERMAN. You understand, of course, in the case of these basic research grants we make there are almost a negligible number where you can expect to get patents. We have been told about some of those cases. If we insisted on a strong patent clause, this would be rather offensive to many research workers. They are not trying for it, and we would rather not get their attention on it either, because they are after fundamental knowledge and not some invention.

Mr. GORDON. Well, how about knowledge resulting in inventions?

How about knowledge acquired as the result of a contract?

Dr. WATERMAN. Those cannot be patented, as I understand it. We do want knowledge to be published, as I said earlier, and everyone concerned wants that done. Then if it is published anyone who wants to make an invention from it can see it.

Mr. GORDON. What we are interested in really is having the knowledge delivered to the Government so it could be diffused throughout our society very rapidly.

Now, in the sample contracts that you supplied me there is nothing that says you have got to be supplied with data. All it says is "We give you the money," and that is all.

Dr. WATERMAN. Well, as I said before——

Mr. GORDON. Apparently you depend on faith in your contractor or grantee that he would deliver it to you.

Dr. WATERMAN. Here you have a situation where, as I said before, the man wants to publish at the earliest possible date. He makes his living by the knowledge he gets published, and the recognition he gets.

The university wants it to be published because their reputation, too, depends on their output.

We want it published because we have the same feeling about it, and we have an additional feeling you just mentioned. Anything valuable done under public funds should be published. I do not know the figures, but in the vast majority of cases there is at least one research paper published during a grant, very often more than one.

In addition we have a final report on the nature of the work, and we published lists of our grants, so that if anyone wants to inform himself he can from that. Now, with everybody concerned wanting to publish, you have, it seems, a situation where it is unnecessary to require this, especially when some results, just because of the nature of basic research, do not pan out. In that case, for example, if a mistake has been made in the person's judgment, there is no need to publish because there is nothing valuable in it. In other words, under our present system anything valuable is published.

Mr. GORDON. Wouldn't that be valuable even if it does not pan out so that others will not go down the same road?

Dr. WATERMAN. Yes; that type of value is always taken into account. This is published. If a negative result is valuable this is published because that is important.

Mr. GORDON. What is the statutory authority for the present policy of the National Science Foundation?

Dr. WATERMAN. As I said in my statement, section 12 of the act; it is a broad statement.

Mr. GORDON. Do you conceive of situations where the acquisition of the patents by the Government would be in the public interest, as in weather control?

Dr. WATERMAN. I cannot claim to be a specialist in patent affairs. In my point of view the important consideration is simply this: That if any discovery is made of the patentable variety, the important thing is, especially if public funds are used, that this be brought out and utilized by the public, otherwise it does not mean anything.

So my cardinal principle is: anything that is useful developed by public money ought to be developed and available to the public for use.

Mr. GORDON. Yes.

Dr. WATERMAN. That is the essential thing.

Now, the question of who has title gets into complications for which the best evidence is the extended debate over this which has occurred over the years, and I cannot claim to be a specialist in that.

I do think the important thing in the situation should be to see that the device is actually developed at the earliest possible date, and put into use so that the public can have it at, of course, a reasonable price and with reasonable return to the inventor or the organization.

Mr. GORDON. Well, by taking title you would be putting it in the public domain.

Dr. WATERMAN. Well, here again, as I say, taking title is not enough unless it is actually developed and put to use, made available.

Mr. GORDON. You think you should—you think you have to give title to somebody else?

Dr. WATERMAN. Title is involved in this arrangement.

Mr. GORDON. Are you saying that you had to give the title to somebody else, that is, a patent monopoly?

Dr. WATERMAN. No.

Mr. GORDON. In order to get it developed?

Dr. WATERMAN. I say I am not an authority on that. I say in my opinion if there is a device which is useful, and especially with public funds, then it should be developed at the earliest date, and be made available to the public at a reasonable price. That is where I stop.

As to who takes title I am not an expert on that, but I do think the cardinal principle is just that, to get it out.

If the Government can take title and develop it and put it to general use, that answers my question.

If private enterprise can do the same thing at a reasonable price that, too, answers my question, and I am not specialist enough to know what, in general, would be the right way to do it.

I suspect that the best plan would be to adopt the principle that I have stated, and then have each agency have the authority to do one or the other in the particular case, because sometimes the particular case would go one way and sometimes another. But that is only my personal opinion.

Mr. GORDON. Would you say merely the receipt by the Government of a royalty-free, nonexclusive license to use an invention for governmental purposes, without considering whether, perhaps, an invention or discovery could be of sufficient importance, such as the control of weather, for example, that an application for a patent should be made for the benefit of the Government?

Do you think it is in the public interest merely to take a nonexclusive license without considering other factors? Wouldn't you say it would be in the interest of the Government to take title in that case to such an important development as the control of weather?

Dr. WATERMAN. This would depend a great deal on circumstances. As I say I do not see how one can answer this question in the general case.

For example, suppose in the process of basic research on weather modification it develops that in order to get on with the research a particular kind of instrument is proposed, designed, and produced just to study some particular phase of research.

One might be to count the number of nuclei, as we know them, in a cloud—nuclei on which there might be condensation.

That is a highly specialized field. At the present time, it is only of use in respect to research in what causes precipitation in the clouds.

The average householder would have no possible use for it. The average corporation would have no use for it either. It is only useful at the time for that particular piece of research.

Well, in that case the advantage to the public, would seem to me, to be very low to have this out in the market. It is only a very special kind of research which requires it, and only a special number of people, so there is no big sale.

Now, that is a special case where, it seems to me, in the best interests of the public you want to put this in private hands, so that it could be made available to the few that need it, and the Government would want to back that.

On the other hand, suppose we got further along with weather modification and developed an instrument which could be used generally by the Weather Bureau, say, to help them in forecasting precipitation or influencing precipitation. That would be a matter of

a great deal higher public interest, and then the question might be answered the other way.

Mr. GORDON. Dr. Waterman, are you implying that if the Government takes title, that is, gets all the rights in a particular invention, it necessarily would not be developed?

Dr. WATERMAN. I did not say that. I cited one particular case where, it would seem to me, that there would be no particular advantage in Government taking title.

I said at the same time there might be advantages for the Government doing so in other cases. I followed that right away by citing a case where the Government ought to take title.

But you see, if you follow my first thesis, if the Government takes title, then it is important for the Government, to see right away that it is developed, produced, and distributed.

I hear people say very often that when the Government takes title it does not see any clear way to get it developed or there is not money to do it and, of course, that is bad if the thing is important.

Mr. GORDON. Do you know of any specific examples or is that a belief?

Dr. WATERMAN. I have made no special study of it.

Mr. GORDON. On the other hand, I can give you many specific examples to the contrary. There are many cases where business secured Government licenses because there was a profit to be made. This has been the experience of the Department of Agriculture, which has the policy of taking title and dedicating it to the public. Businessmen were very anxious to get nonexclusive licenses to produce the items developed with public money because there was a profit involved.

I think that this argument which you hear very frequently can be refuted very, very easily.

Dr. WATERMAN. Well, I do not think I gave you an argument of that sort, did I?

Mr. GORDON. You said it was something you heard about.

Dr. WATERMAN. Yes, because I have had no direct experience with those matters.

But it is not evidence enough that this debate has gone on for years and years as to which is best, to show that there are cases on both sides.

Senator LONG. Dr. Waterman, you said on page 4 of your statement that a number of universities have contracts with the Research Corp.—I would be curious to know the percentage that made contracts with this organization, which applies for, and, receives the patents, and then returns to the universities part of the money it receives from the inventions, for research and——

Dr. WATERMAN. Education.

Senator LONG. Well, for research and educational purposes.

It is divided among the institutions, the inventor and the Research Corp., which means that, for the most part, it goes back into research again?

Dr. WATERMAN. Yes.

Senator LONG. In view of the shortage of funds to do basic research, would that not be a good way for your organization to operate? In other words, to split the money 50–50, or split it three ways if you find something that you could get some money for, and you would get part of it and go and put that back into more research?

Dr. WATERMAN. It is possible, certainly. Our philosophy has been that if universities are doing this, it accomplishes the purpose, and they are very familiar with dealing with this situation.

Senator LONG. In that sentence, two or three down here, then you say that only a small percentage of your money is given to universities. Most of it you give to——

Dr. WATERMAN. I beg your pardon?

Senator LONG. You spend with private concerns.

Dr. WATERMAN. I beg your pardon. It is the other way around. Most of our money, by far the greatest part of our money, goes to universities and educational institutions.

Senator LONG. Most of it goes to universities?

Dr. WATERMAN. Yes, almost exclusively.

Senator LONG. So that insofar as money goes to the universities, it is achieving this result?

Dr. WATERMAN. Yes, that is right.

Senator LONG. The universities, I assume, are making contracts with their staffs that the university will take title and pass it on to the Research Corp.? And the Research Corp.——

Dr. WATERMAN. That is right.

Senator LONG (continuing). Will float the money back down for educational and research purposes?

Dr. WATERMAN. Yes.

Senator LONG. Well, if that is what is happening, if the universities think that is the wise way to do it, it would also be a good way to handle the rest of it by having an understanding that you would split the money two or three ways, the part you get back going into research again.

Dr. WATERMAN. Could I ask general counsel, Mr. Hoff, to speak about this?

Mr. HOFF. If I may amplify that a little, the number of universities having contracts with the Research Corp. is going up rapidly, so that 80, over 80 of the colleges and universities do it. Of the remaining universities——

Senator LONG. How many do you have such contracts with?

Mr. HOFF. Well, this is hard to say. If they were the same 80, 80 would take care of a large proportion.

Senator LONG. Yes.

Mr. HOFF. But I was going to continue saying along that general line, a large number, a large porportion, of the other universities that are heavily engaged in research have policies which produce the same results, namely, they will pass on any invention of a member of their staff on sponsored research or, in fact, on any research that is not done away from the ties with the university, and will decide whether it is worth seeking a patent for, and if they do, the university will take the assignment, and the inventor will get a small percentage, roughly comparable to the contracts with the Research Corp. where the percentage to the inventor generally is between 7½ and 15 percent of the gross royalties.

So that I would say that it is pretty hard to say all, but the trend is such that I am quite sure in my own mind that in a relatively short time now almost all, the universities which are really doing research and are receiving funds to sponsor it, will have a policy which will

achieve the same results as the Research Corp., and in this respect I would just like to say, put a postscript on Dr. Waterman's remarks to Mr. Gordon on the whole question of publication and invention.

In those few instances, we do not know of any patent that has been issued yet on any of our research grants, and have only heard of 15 applications——

Mr. GORDON. May I interrupt you for a moment, please?

Mr. HOFF. Yes.

Mr. GORDON. Here is something very specific. In the contract that we were discussing on weather modification, in article E under "Patents," you talk about the "Subject Invention," so apparently an invention was expected to result from this research.

Dr. WATERMAN. This just covers the contingency, not necessarily the expectation.

Mr. GORDON. All right. If a patent is secured, if something turns out to be patentable.

Dr. WATERMAN. Yes.

Mr. GORDON. Let me read part of this section on patents:

No license granted herein shall convey any right to the Government to manufacture, have manufactured, or use any subject invention for the purpose of providing services or supplies to the general public in competition with the contractor or the contractor's commercial licenses in the licensed fields.

This is a monopoly. This contract is not made for emergency or defense purposes. Why should such a clause be inserted which would give a monopoly to a product developed with Government funds?

Dr. WATERMAN. May I ask Mr. Ruttenberg to answer that, please?

Mr. RUTTENBERG. I am familiar now with this particular contract, and it happens the one you have is not typical in the sense that the clause you were talking about earlier, (b), appears only in two contracts.

The clause you are talking about now also is not typical in that it appears, I think, only in a few contracts.

Senator LONG. Who was that contract with?

Mr. RUTTENBERG. American Machine & Foundry for research in the field of, basic research in, weather. Its total value, I think, is $16,000. It is a small contract, but the company is a big company.

Now, with respect to the first clause you were talking about, if I can go back there a minute——

Senator LONG. Why would you sign that contract at all?

Mr. RUTTENBERG. Beg pardon?

Senator LONG. If that is not your usual way of doing business, and you have a lot of people you are doing business with without putting any such clause in the contract, why did you give it to them?

Mr. RUTTENBERG. It is not an unusual grant to them. The language is more specific, but I believe it is the general policy of the Government that it is not intended that the Government will go into commerical production in competion with anything that may be developed. It is spelled out in more detail here, but this is not any special grant to the company, if I am making myself clear on that point.

It is just a language clarification in this particular contract, but it does not carry any additional authority.

Mr. GORDON. Would you say that this clause gives the company a monopoly in a device developed, or possibly developed with Government money?

Mr. RUTTENBERG. Well, the first thing I would say is that as Dr. Waterman mentioned, this is basic research, and it is not anticipated there will be anything.

If there were an invention, the company would have the rights to the invention should there be one

Senator LONG. Doesn't that clause you are talking about say, in effect, that if this company finds an answer to weather control, and it should get a patent on anything related to this subject, it would be theirs, and the Government would not have the right to use that patent?

Mr. RUTTENBERG. It would have the right to use it for governmental purposes as distinguished from commercial competition. I think that would be the way it would be understood,

Senator LONG (reading):

> No license granted herein shall convey any right to the Government to manufacture, have manufactured, or use any subject invention for the purpose of providing services or supplies to the general public in competition with the contractor or the contractor's commercial licensees in the licensed field.

It seems to me that this is very specific. If a certain firm succeeded in finding an answer to this weather problem, and it is patentable, that the Government can only do business with them, and that the Government cannot even hire some other contractor and pay him a license fee unless they agree to it.

Mr. RUTTENBERG. The rights retained by the Foundation under any of these are to use the invention for governmental purposes.

Now, what governmental purposes may mean in a particular case has to be determined in each case, but it certainly would be true under this contract or any of the others that the Government would have the right to use the invention for governmental purposes. But the object would not be for the Government to go into business.

Senator LONG. Let us just take a specific situation.

In Louisiana, there is a large metropolitan area on the Mississippi River. It is growing to where it looks as though one of these days it will be one continuous city from Baton Rouge to New Orleans. South of this area you have the swamps.

Someone suggested—and it does not seem too fantastic—that rather than lose all these workdays in the construction industry because of rain, if you have a practical method of cloud seeding, and you have a front moving in toward this commercial area, it might be possible to cause the water to be dropped on the swamps. You would then preserve your workdays in an area where you do not have too much work anyway, and you would not lose many workdays because of rain.

Suppose this company finds the answer to that problem, that is finds a practical way of seeding those clouds and dumping that rain where you want it to fall, so that it will not fall in the other place.

This contract would mean that company can say, "Well, fine, we will solve that for you."

Suppose they say the fee is $50 million, and then you say, "Well, wait a minute, that would seem terribly unreasonable. The Government will provide that service," and the people say, "No, they will not take care of it. We have a special clause in our contract so that the Government will not provide that service for the general public."

Isn't that what this provides?

Mr. RUTTENBERG. I think, as Dr. Waterman mentioned earlier in these contracts that we have now, the four that are in actual activity, an examination of the research work to be done, and so on, does not indicate that there will be any particular developments along those lines

Senator LONG. Do you know why this fellow wanted this clause in there?

You do, do you not?

Mr. RUTTENBERG. This clause is not unusual in the Government. It states only that if they do come up with something which was developed under their own steam, and where the Government might have a right to use it, they do not want to have the Government go into commercial competition, Mr. Chairman.

Senator LONG. That is right; and you could have gone ahead and stated the rest of it. This fellow negotiated and bargained for a special contract whereby he would be in position to charge all the traffic will bear if he succeeds in finding something with this Government money.

Why should he insist on your putting that into the contract?

Mr. RUTTENBERG. I did not deal directly with the contractor in the negotiations, but that right is not greater than, as I see it, any of the rights we have given in any of the other three contracts.

Senator LONG. Can't you see that it is this much greater, that this fellow could be completely unreasonable about providing a service which he developed with our money, and that he could be in a position to charge us all the traffic would bear for it?

Mr. RUTTENBERG. Mr. Chairman, I think——

Dr. WATERMAN. Mr. Chairman, I think——

Senator LONG. That question can be answered "yes" or "no."

Dr. WATERMAN. The questions that you are asking of me do not apply to this one at all, for this reason. This belongs under the head of what I said earlier. This company is being asked to devise a research tool which cannot conceivably be used as a means of weather modification.

They are competent in building a particular chamber which is known as a cloud chamber by physicists, where they are interested in passing light through this and seeing the degree to which the light gets absorbed.

This is necessary for the basic research to determine the fundamentals of the properties of the atmosphere. But no one can see any possibility that this would ever be used commercially. It is just a research tool that we want.

Senator LONG. This fellow can see the possibility, can he not, granted he has more foresight than you have? He apparently can see the possibility. Why else would he want it in the contract?

Dr. WATERMAN. It is a question of the best judgment that one can exert on it, but I think he put it in because it is a standard form. He probably does that with everything he undertakes, and we do not see any possible commercial use to this, but we have got to get the thing done, you see.

Senator LONG. Well, it would seem to me that if you just keep using that kind of foresight, and if you ever do get an answer to the problem, it won't do the public much good, in spite of all the money

it paid for it. It might just as well have the fellow do it with his own money to begin with.

Dr. WATERMAN. It goes to a private concern because it is a job of construction which they are experts in. They do not care what it is finally used for, but their job is just to produce this item.

It is conceivable, Mr. Chairman, in the process of making this thing they might come up with some particular tool or some particular gadget that was developed to make this chamber which they could patent. It would have no possible connection with weather modification at all, but some part of the structure or the means of fabrication, and they have a fair right to that, you see.

I think this is intended as a general clause which they apply here, but to anyone who knows this subject this would not be a thing which could be of commercial importance.

Senator LONG. Here is the point. The people for whom you are spending most of this money do not agree with you at all, not with your philosophy, because they are saying that people whom they hire should take these patent rights, and should use their money to promote the public interest, not private interests of certain individual firms.

But, in turning that money loose to this fellow without getting any rights in return, the public interest is not served. You could do, for example, what some universities are doing, and say in the contract, "Well, now, we want to get something back out of this. We will split with you 50–50 or we will get the right for the Government to use it for the benefit of the public."

But these fellows specifically say that will not be the case.

How many other contracts do you have with this clause in here that the Government cannot use the rights it pays for to provide services for the public?

Dr. WATERMAN. This is the only one I think of.

Mr. RUTTENBERG. This maybe the only one.

Mr. GORDON. Let me explain how I got a copy of this contract. I did not ask for this specific contract, Mr. Chairman, and I did not even know about it, but I called up the National Science Foundation and asked them to send me sample or typical contracts and this is what I got. When I read the patent section I was very unhappy.

Dr. WATERMAN. Mr. Chairman——

Mr. RUTTENBERG. We have the others with us, and I think you can see we do not have it in all the others that are with us.

Senator LONG. What percentage of your funds are spent with universities?

Mr. RUTTENBERG. Well, Dr. Waterman can answer it. It is 99-something percent spent with universities.

Dr. WATERMAN. I suppose we make—we have hundreds of grants that we make with universities.

Senator LONG. What percentage of the money?

Dr. WATERMAN. The percent of the money is, well, something of the order of $300,000 divided by $56 million, or about half of 1 percent.

Mr. RUTTENBERG. $56 million with universities, $300,000 with commercial organizations; that is the ratio.

Senator LONG. $56 million with universities?

Dr. WATERMAN. Yes.

Senator LONG. What you have told me here is that the universities generally seem to prefer to take the patent rights and use them for education and research?

Dr. WATERMAN. In the end, yes.

Senator LONG. Because the money goes to one of two places. It goes either to the inventor as an incentive to him, or it goes back to the university, which would use it for either further research or for educational purposes, which from the viewpoint of the public are very desirable purposes.

Thank you very much. I have no further questions.

Mr. GORDON. I have some more questions.

Incidentally, did you say this was or was not a typical contract?

Mr. RUTTENBERG. It is supposed to have been. I did not see it before it—

Mr. GORDON. Is a contract which has this particular clause in it, a typical contract?

Mr. RUTTENBERG. No.

Mr. GORDON. It is not typical?

Mr. RUTTENBERG. No, it is not. That is what I was saying earlier. I think this may be the only one we have that has that clause in it—I would have to check to determine if this is right.

Mr. GORDON. Was this inserted on demand of the contractor?

Mr. RUTTENBERG. That I do not know. I will have to check that for you because I did not deal directly on the contract. [14]

Dr. WATERMAN. I would like to repeat, Mr. Chairman, in a contract with a commercial firm they have in mind anything that can be used in connection with the construction, and not necessarily only the device which they are furnishing to us, so it seems to be natural they would be able to apply for patents on things which did not concern this final instrument at all.

One further thing, and if in any of the further contracts we make there is any foreseeable use which would be patentable and valuable, then we would, of course, reserve the right to control that.

Mr. GORDON. Here is another contract we have, a National Science Foundation research grant, NSF–G. I guess it is a grant.

Mr. RUTTENBERG. That is a grant.

Mr. GORDON. Let me read you a couple of sentences here:

> It is a further condition of this grant that disposition of patent and other rights of any inventions or discoveries made or conceived during the research shall be the responsibility of the grantee; that the grantee—and so on and so forth, shall get reasonable notice, and so forth.

As I understand it, you are making the disposition of the patent developed with Government money the responsibility of the grantee; is that correct?

Mr. HOFF. I would like to say one more word on this. This is the standard grant provision for the university grants. One thing that

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[14] Information subsequently supplied by Mr. Ruttenberg:

"The following material is in further reply to the question: 'Was this inserted on demand of the contractor?' which was asked by Mr. Gordon:

"The language of the clause in question was not inserted on the demand of the contractor. It was inserted by the National Science Foundation and was intended as clarifying language, similar to that used by other Federal agencies. The clause was not designed to give these contractors any special rights not given to other contractors."

has not been brought out is we cannot quite say that this research is being done entirely with Government money.

Certainly the Government is giving some support to it. But much that has been done before has also gone into it, and also a lot of the university's finances. In other words, this is not a full support of anything. It is a help toward their doing it.

Mr. GORDON. But it could be?

Mr. HOFF. It could be? Very unlikely.

Mr. GORDON. Very unlikely?

Mr. HOFF. Because, after all, all we are doing is supporting some of a man's work. He may have been working on it for 20 years previously. What we are doing is, in the typical case, permitting him to get some assistance.

The university is generally paying his salary itself as the chief investigator; that in almost all cases is paid by the university, so what you have got is assistance on an ongoing job or on a new job this fellow has thought of because of what he has done in the past.

Now, to put this again into perspective, certainly there has been the vitamin D patent which came out of research which was very valuable, and so have been a few others.

The total value of those, though, is not large in terms in which we are thinking and, futhermore, of the thousands of grants that we have made, we have only received word, although it is required, we have only received word of applications having been filed in 15, and we have received no word of any patents having been issued, and in the great bulk of the cases any returns would go back into the purposes for which the money was appropriated by Congress, namely, research and education in the universities.

Mr. GORDON. Let us get back to this Research Corp. you are talking about. Is it a private or Government institution?

Mr. HOFF. It is a nonprofit private organization for this purpose.

Mr. GORDON. It appears that this nonprofit institution decides what patents to secure for the universities it has contracts with; is that correct?

Mr. HOFF. First, I believe the universities screen them. After all, as you know, in the patent business, a lot of ideas come along, and the first question is, "Is this worth patenting?"

Nobody wants to go to the trouble and spend the sums necessary if they think the thing is of no commercial use, and it is in this sense that Research Corp. decides whether they are willing to go ahead and bear the costs of prosecuting a patent application.

Mr. GORDON. But they also can decide not to do so if they find——

Mr. HOFF. Certainly. I do not know what percentage. I would assume in the great majority of cases put to them they decide it has no commercial use.

Mr. GORDON. But it is this private organization which decides, in a way, what patents to secure, what patents to license, once it secures the patents; whom it should license, which patents it should license; how much royalty should be paid, and so forth?

Mr. HOFF. Yes.

Mr. GORDON. This is a private institution. Is it a good idea to have a private organization, with which the Government does not have an agreement, decide what should be done with the product of

Government-sponsored research, even if the Government paid for only part of it.

Mr. HOFF. Part of it.

Mr. GORDON. Shouldn't this be a governmental function?

Mr. HOFF. Well, I suppose the universities would argue on the other side; namely, that they have a large stake in this, and they do not care to have the Government take it over. I think you can argue that on both sides. I think if the Government were to do it—well, I will put it this way.

If the National Science Foundation were to require that it make a determination and prosecute patents, and if any substantial volume of inventions arose, our staff would go up not only appreciably, but dramatically. We would have to staff entirely differently. We would have to have many times the lawyers that we have now, and so forth, and I question whether this would be worthwhile from the Government's standpoint.

Senator LONG. I do not care to argue the point any further, but it does seem to me that this agreement you made with this private company where the Government has a nontransferable license to use the machine that this man is to develop, and if the Government cannot use this to provide services to the general public, it would appear that anybody who wanted to compete with this fellow in the weather research business, unless he was directly on the Government payroll, would not be able to use this machine that you wanted him to develop unless he agreed to it.

Mr. HOFF. Let me take a shot at telling my views to you on this.

In this case we are making a grant of $16,000 to a corporation which has put a great deal of development work and so forth into their whole going business, and into the manufacture of this particular thing, which is why we placed the contract with them, I would assume.

Now, I would like to reiterate what Dr. Waterman just said, that where we make the contract with a private profitmaking concern, and it looks as though there might be an invention of substance not just in line with its own business, something it has been perfecting over a long period of time, what we would do, would be to consider reserving the right to determine the disposition of the patent rights until such time as the implications of any invention could be determined with some degree of reality.

Now, as we have mentioned, we have only had eight contracts with private concerns to date.

We go to the private concerns because they are the ones that have a peculiar competence in that particular field, as shown by eight contracts with commercial organizations for scientific research with a total value of less than $400,000, as against approximately 6,200 grants to universities, amounting to approximately $120 million made since the Foundation was established.

When we do go to them with a small contract, which comes on the end of the work they have done, I think we should consider what we can do for the Government, but I doubt that we ever are going to be able in that type of situation to get the full patent rights for the Government. That is my feeling on the matter.

Senator LONG. It would seem to me that if you are going to draw up a sample contract and are going to have a definite policy, rather

than try to anticipate what might happen under a contract, you might do better to draw one up that would cover all eventualities. That is why my thought would be that you would not want to do for one company what you would not do for another.

Mr. HOFF. No, sir. It depends on the nature of the work. It is not that one company gains over another, but if we give a $16,000 contract to manufacture a tool, in effect, which they are in the business of manufacturing, that is one type of situation.

If, on the other hand, we were to make a contract for applied research in dispersing storm clouds, and this was something the company had not spent, well, it is not something that they had put an overwhelming amount of their own money into, then I would say we would have an entirely different situation, and no matter what the company is, the possibilities of the Government there would be much greater, and should be taken care of in drawing the contracts.

Dr. WATERMAN. You see, Mr. Chairman, after all, the situation is simply this: we are asking the company to build a box that they know how to build. Well, it is purely of use to the basic research people in studying this problem. But anyone who knows the field cannot perceive any possible way that it could ever be used commercially except for special basic research at this particular stage.

To a scientist this looks like straining a point, but, as Mr. Hoff said, if we foresee any possibility in a thing like this, we would certainly guard against this by a suitable clause.

Senator LONG. I have no further questions.

Thank you very much.

I was going to hear Mr. Herbert B. Warburton of the Post Office Department, but if you do not object, I believe we will recess and let you have some lunch, because we will have some questions to ask you when you return at 2 o'clock. We will meet here then at 2 o'clock.

(Whereupon, the hearning was recessed at 12:30 p.m., to reconvene at 2 p.m., the same day.)

AFTERNOON SESSION

Senator LONG. All right, Mr. Warburton, come forward and summarize your statement briefly.

STATEMENT OF HERBERT B. WARBURTON, GENERAL COUNSEL, POST OFFICE DEPARTMENT; ACCOMPANIED BY LOUIS J. DOYLE, ASSOCIATE GENERAL COUNSEL; ADAM G. WENCHEL, ASSISTANT GENERAL COUNSEL; AND RAYMOND B. ROBINSON, ASSISTANT MANAGER, PROGRAMING AND CONTROL STAFF, OFFICE OF RESEARCH AND ENGINEERING

Mr. WARBURTON. It is pretty much in summary form, Mr. Chairman.

Senator LONG. Read it if you want to.

Mr. WARBURTON. I think it would be more helpful.

Mr. Chairman, I am Herbert B. Warburton, General Counsel for the Post Office Department. I am accompained by Mr. Louis J. Doyle, Associate General Counsel, Mr. Adam G. Wenchel, Assistant General Counsel, and Mr. Raymond B. Robinson, who is Assistant

Manager, Programing and Control Staff, Office of Research and Engineering.

The Post Office Department entered into the research and development contract field in 1949 when the Congress enacted the first statute directing that it embark on this type of activity, and the citation for that staute is title 39 United States Code, section 847 and 847(a).

The purpose was to introduce modern practices in the postal field service, with emphasis on the development of new mail handling machinery and equipment.

The first Post Office Department developmental contract was let in fiscal year 1952. The initial momentum was giving to the program with the Department's establishment of the Office of the Chief Industrial Engineer early in 1953. That office eventually was designated as the Office of Research and Engineering.

The Department has entered into a total of 39 contracts of this type since 1952 and their objectives have been and are for the development of, as example, facing and culling machines, mail sorters, electronic reading machines, and the like.

The Post Office Department had 14 research and development contracts in force as of September 21, 1959. The total amount of money obligated was $7,511,320. Of these contracts, nine were held by what may be designated as small businesses. In fact, the Department has and continues to seek the active engagement of this type of business concern in this work.

Since the Post Office Department entered into this field relatively recently, when, in its understanding, a general Government patent practice had been established, it naturally fell into line with that practice and adopted the Armed Services Procurement Regulations clause on patent rights. The Department has felt not only that it did not have the experience necessary to strike out in a direction different from other Government contracting agencies, but also felt that any major deviation from the general practice would result in confusion.

Therefore, the policy of the Post Office Department with regard to patent rights under research and development contracts is to require the contractor to grant to the U.S. Government an irrevocable, royalty-free license to practice, and cause to be practiced, by or for the U.S. Government, throughout the world, each subject invention in the manufacture, use, and disposition, according to law, of any article or material, and in the use of any method. The type of organization involved as the contractor is immaterial.

The Government's license, so granted, is nonexclusive. The contractor is free to grant licenses to others, and the Government may not, under its license, manufacture, have manufactured, or use any subject invention to provide services or supplies to the general public in competition with the contractor or any of his commercial licensees. However, it is further provided in our contracts that the U.S. Government, acting through the Post Office Department, may grant or authorize the granting of a sublicense to one or more foreign governments for use, in such instances, solely in that Government's mail handling activities.

This policy leaves the contractor free to hold title to all patents, either domestic or foreign, on any subject invention, to grant licenses to others, and to avail himself of all commercial applications and

benefits, while permitting the U.S. Government to avail itself of all applications for governmental operations and purposes, and to sublicense foreign governments when such is advantageous to the United States, either politically or in connection with an exchange of technical information.

In all research and development contracts, regardless of the type of organization involved, it is the Post Office Department's policy to include provisions whereby the Government may duplicate, use, and disclose in any manner and for any purpose whatsoever, and have others so do, all subject data delivered under the contract. It is provided also that if any subject data are, at the time or any time thereafter, covered by copyright, the contractor will grant to the Government, its officers, agents and employees acting within the scope of their official duties, a royalty-free, nonexclusive, irrevocable license throughout the world, to publish, translate, reproduce, deliver, perform, dispose of, and to authorize others so to do.

As a result of its research and development program, the Department is beginning to collect technical data of various types. Thus far, it is not aware of any desire on the part of business for access to these data. However, should requests be made for such access, the Post Office Department would consider them sympathetically, of course.

In Senate Report No. 97, Senate Judiciary Committee, dated March 9, 1959, it was stated on page 1 that "* * * the President's budget for 1960 submitted to Congress asked for over $5 billion for research and development * * *." The Post Office Department requested $5½ million, or about eleven-tenths of 1 percent. All of this money does not go for funding research and development contracts of the nature we are discussing here, in the sense that a portion pays for the salaries of employees, and like uses. The comparison does appear to support the proposition, however, that the Department's effect upon the economy in the area in which this subcommittee is interested is insignificant.

The Department has entered into 39 research and development contracts since the beginning of its program in 1952. Contractors have reported the filing of 25 applications for the granting of patents under the program, four of which have been granted.

This Department is aware of the controversy as to whether commercial title to inventions made under research and development contracts should be retained by the contractor or the Government. Thus far, Congress has not spoken. Absent a definitive decision by the Congress, each Government agency must decide for itself what disposition of interests in inventions made as a result of research and development contracts will best promote the Government's interest. We believe that the policy which this Department has followed best serves the Government's interests.

Mr. WARBURTON. Thank you.

Senator LONG. We will go ahead with questions from counsel. Would you like to ask some questions, Mr. Gordon?

Mr. GORDON. What is the basis for your statement on page 2 that a general Government patent practice had been established?

My impression was that it had not been established.

Mr. WARBURTON. Mr. Gordon, when this program was initiated, we had no patent experts in the Department. We made what was

to us as good a survey as could be made by inquiry and it appeared to us that there was the general Government practice to which I refer here.

Mr. GORDON. There is no general Government practice, is there?

Mr. WARBURTON. Let me say it this way, sir, that it appeared to us that the predominant number of the agencies which were involved in the type of activity we were about to embark on seemed to follow this Government patent practice which fell in line with the Armed Services Procurement Regulations clause on patent rights. This is the best information that we have been able to develop, sir, as to how our present procedure initiated.

Mr. GORDON. You stated that the Department of Defense is engaged in performing the same type of functions you perform.

Mr. WARBURTON. In the sense that we basically seek to secure as the end product of our research and development contracts, hardware which is basically and primarily intended for the purpose of the Post Office Department.

Mr. GORDON. Are you acquainted with the Senate Patent Subcommittee's report?

Mr. WARBURTON. Yes, to an extent.

Mr. GORDON. Do you recall the discussion of the particular clause by which the contractor is free to grant licenses to others and that the Government may not under this license manufacture, have manufactured, or use any subject invention to provide services or supplies to the general public in competition with the contractor or any of its commercial licensees?

Mr. WARBURTON. That is right, sir.

Mr. GORDON. Now, the Railway Express Agency and other such firms believe that you are in competition with them in the handling of parcel post for example. You are aware of that, are you not?

Mr. WARBURTON. I think that without question a similar type of service is performed in certain areas.

Mr. GORDON. Conceivably, they could regard their activities as being in competition with those of the Post Office?

Mr. WARBURTON. I imagine that could be their attitude, Mr. Gordon.

Mr. GORDON. If that is their attitude, then, it is not possible that they can block you from using those very machines which you paid to have developed?

Mr. WARBURTON. Could I ask you to repeat that question, Mr. Gordon?

Mr. GORDON. If they decide that they are in competition with you, they can probably block the use of those machines which you paid to have developed. Isn't that correct?

Mr. WARBURTON. No, sir, because we have the license and even though Railway Express, for example, in the performance of its function, contracted with the contractor with whom we originally contracted to procure that type of machine for their purposes, this wouldn't block us from securing that type of machine for our purposes.

Mr. GORDON. Wait a second. It says here in your contract that the contractor is free to grant licenses to others in competition with the Post Office Department. Is that correct?

Mr. WARBURTON. That is right, sir.

Mr. GORDON. And the Government may not under its license manufacture, have manufactured, or use any subject invention to provide

services or supplies to the general public in competition with the contractor or any of his commercial licensees.

Mr. WARBURTON. Our understanding of that clause, Mr. Gordon, is that we consider that their purpose is distinct from that of the parcel post service and we therefore feel that the clause does not have the result that you indicate it might have.

Mr. GORDON. Before the Senate Post Office and Civil Service Committee, the Railway Express Agency regarded the Post Office Department's parcel post service as a competitive service.

Mr. WARBURTON. That is right, sir.

Mr. GORDON. Now, they can probably take you into court and say, "Look, we are in competition with you even though you may have paid for the development of this particular item."

Mr. WARBURTON. Well, the Railway Express Agency on that basis is entering into court and I don't think it would prevail, because it is not legally able to enjoin the Federal Government and the Department, but by the same token, as I indicated, we have not experienced under this clause the situation that you seem concerned about.

Mr. GORDON. But don't you put yourself in a position where you expose yourself to such action?

Mr. WARBURTON. It could be. I presume, Mr. Gordon, the Department could become involved in a controversy on that clause as on any other clause.

Mr. GORDON. But this particular clause seems to be an invitation to a lawsuit.

I am an economist not a lawyer, and when I read this it seems to be quite obvious to me.

Mr. ANSBERRY. Mr. Warburton, are you putting your argument on the basis that sovereign union would protect the Government from suit in this case?

Mr. WARBURTON. No, we are putting our argument on the initial basis that we felt, as demonstrated by the fact that this clause is included in the ASPR as we adopt it in our contracts, that this language does not raise the basic difficulty to which Mr. Gordon refers. We can be involved in a legal controversy, including this; even if we were involved in a controversy on this score we could still prevail on the legal merits. We do not rely solely on that latter ability.

If that were our situation, we as attorneys would not have this included in our contracts.

Mr. ANSBERRY. I think the two clauses in your contract a little bit inconsistent.

Mr. WARBURTON. Which are those, sir?

Mr. ANSBERRY. There is one clause that says the Government has got a nonexclusive——

Mr. WARBURTON. Well, that is irrevocable in a sense.

Mr. ANSBERRY. Yes. There is another that says it can't use that in competition with the inventive contractor for public benefit, benefit of the general public.

Now bear in mind that money that you are spending is presumably spent for the general welfare.

I don't see how, having spent the money for the general welfare, we cannot have a clause that says you cannot use it for the benefit of the general Government but you can use it for the benefit of the general public. The two are essentially the same thing.

Mr. WARBURTON. Essentially the same parties, yes.

Mr. GORDON. I could very well understand why the armed services would—although I don't agree with it—have a clause like this because nobody is going to produce arms and planes for use in commercial markets in competition with the Government. But the Post Office is clearly a civilian organization and I cannot understand why the ASPR clause which may be suited particularly to the kind of materiel that the defense services are interested in, could be applied to civilian items.

Mr. ANSBERRY. Let me ask you this question:

Did you investigate, for instance, the patent policy of the AEC and the patent policy of the Department of Agriculture before adopting a DOD policy?

Mr. WARBURTON. As I indicated earlier, sir, according to the best historical information that we can determine, at the time we entered on this program, beginning with the statute in 1949, there was apparently an examination made of the various policies of the various agencies.

I could give you no precise information, sir, because we have been just unable to find it in the files.

Mr. ANSBERRY. Going back to my previous question, do you think those two parts of the clause are consistent with each other?

Mr. WARBURTON. We have not thought of it previously as being inconsistent.

I would like to think about that and give you an answer to it.[15]

Senator LONG. The point that impresses me is that made by the Patent Subcommittee of the Committee on the Judiciary. I would presume that that committee staff has a lot of good lawyers on it and the chairman is regarded as a good lawyer himself. Incidentally, he was Assistant Postmaster General at one time. Here is the language:

> Instead, he is required to grant to the U.S. Government an irrevocable, free license. With this license, the Government may practice or cause to be practiced throughout the world, each invention but with the limitation the Government may not use this license in competition with the contractor or any of his commercial licensees.

Now, that would mean this to me, that the Government cannot license any other firm to manufacture this piece of equipment developed with Government funds because that firm would be in competition with the contractor who did the research for the Federal Government.

So you couldn't license anybody to manufacture the equipment in competition with the contractor, if the contractor wanted to manufacture and sell this equipment. If he gave a license to the Railway Express, you couldn't use it even if you bought it.

Can you see any other interpretation on that?

Mr. WARBURTON. Excuse me, just one second.

Senator, the premise that we have gone is the thought that there is no inconsistency; that first we can have it manufactured for us, for the Post Office Department, and secondarily, we are not in competition.

Now, Mr. Gordon, of course, indicates he feels that the Railway Express Agency has specified they are in competition in parcel post and has raised this question in his mind.

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[15] See exhibit VIII, beginning p. 213, for information subsequently submitted for the record.

Senator LONG. Well now, I personally reported a bill to take you out of transporting certain types of materials when I was on the Post Office Committee because I was satisfied that you were in competition with private industry. The previous Postmaster General came up and testified before the committee that you were in competition with the Railway Express Agency, for example, in the parcel post end of it. It seemed to me that it was well understood such activities were competitive.

You say that these people can't sue you because of the sovereignty of the Federal Union, but they can refuse to deliver any more equipment to you even if you need it. Although you paid to have it developed, you would be powerless to do anything about it.

The question that occurs to me is why you would want to enter into a contract in the first place if you have to hide behind this sovereignty of the Union.

Mr. WARBURTON. That is one aspect of it. That we could anticipate the controversy that would arise under any clause in the contract.

This did not deny the fact that we do not believe and have not believed up to this point that there was an inconsistency, and I indicated that the matter of sovereignty is only a question that could be raised in a defense, in the event a controversy arose, not destroying our belief that these two clauses are not inconsistent.

I would like to suggest to the chairman, if I may, because this matter is of concern to the committee, that we would like to examine it and if we may, by letter or otherwise, indicate to you the reasons why we express the position we do.[16]

Senator LONG. Well, it never occurred to you that you might find yourself in that position when you agreed to that condition, did it?

Mr. WARBURTON. No, it did not, Senator; and that I think is what I have been trying to say here in response to these questions.

The bulk of our research and development contracts up to this stage have dealt completely with letter mail so this didn't raise the question.

Senator LONG. We had a witness up here just prior to you who agreed to a condition in the contract that the Government's license rights under that contract would preclude the right to use that license for the benefit of the public.

Mr. WARBURTON. We heard the doctor testify.

Senator LONG. These people thought they had not given anything away in the public interest, but it seems to me the fellow who insists on putting that in the contract definitely had something in mind when he insisted on that statement.

I would suggest that you supply something on that.[16]

Mr. WARBURTON. I will be very happy to report to you on that.

Mr. GORDON. Are you still using the clause on page 4?

Mr. WARBURTON. Yes.

Mr. GORDON. The Patent Subcommittee's report to which I previously referred came out probably several months ago. Are you still using this clause?

Mr. WARBURTON. We haven't received that report. I haven't read that one.

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[16] See exhibit VIII(A), p. 213.

Mr. GORDON. You have not received that report? [17]

Mr. WARBURTON. No.

Mr. GORDON. You haven't read it?

Mr. WARBURTON. No, we haven't even seen that report.

Mr. GORDON. It discusses the patent rights of the Post Office Department.

Mr. WARBURTON. Mr. Gordon, what is the date on that report?

Mr. GORDON. It came out, perhaps, about a month ago.

Mr. ANSBERRY. November 5, 1959.

Mr. GORDON. What is the subject matter of the 25 applications for patents you mentioned on page 4 (see p. 200) of your statement?

Mr. ROBINSON. I do not have all of the titles here. However, I can submit that information for the record and will be glad to do so. [18]

Mr. GORDON. Without giving me the titles now, could you answer the following question: Can these inventions be used to perform needed functions for private business?

Mr. ROBINSON. To perform any function in private business?

Mr. GORDON. Could they be used by private business? Would they have any commercial application at all?

Mr. ROBINSON. Well, I will have to say that the contractors who applied for these applications felt that they would have commercial application.

Mr. GORDON. Under your present patent policy, however, can't the contractor prevent the use of a patent for commercial purposes by anyone other than a firm he chooses to license?

Mr. WARBURTON. As to commercial applications, Mr. Gordon, yes. As to Post Office applications, our position has been no, because it is not the Department's intention to compete in the commercial application with the contractor holding the patent.

Mr. GORDON. You give all patent rights to the contractor, is that correct?

Mr. WARBURTON. That is right, sir, we do not operate under the title theory but under the license theory.

Mr. GORDON. And the contractor can select any licensee he desires?

Mr. WARBURTON. That is right, sir.

Mr. ANSBERRY. Mr. Warburton, you testified that this policy was adopted in 1949 at the time the statute to which you referred was adopted and you testified you were not too familiar what had been done at that time.

Now do you think that the contrary policy of the AEC and also of the Department of Agriculture where the Government takes title to patents should have been explored by the Post Office Department before deciding that the DOD position was the best one for its purposes?

Mr. WARBURTON. Let me make one comment concerning the earlier part of your statement, sir.

As well as are able to determine, the statute was enacted in 1949 but, apparently, the policy was not adopted in this form until about 1952.

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[17] Patent practices of the Post Office Department. Preliminary report of the Subcommittee on Patents, Trademarks, and Copyrights, Senate Judiciary Committee, 86th Cong., 1st sess. (committee print).

[18] See exhibit VIII(B), p. 215.

Mr. ANSBERRY. By whom was it adopted?

Mr. WARBURTON. It would have been Mr. Jesse M. Donaldson who was Postmaster General then.

Mr. GORDON. Mr. Warburton, if a businessman, small or large, asks you for permission to examine the technical data referred to on page 4 (see p. 200) of your statement, can you let him see it?

Mr. WARBURTON. Oh, yes; yes, indeed.

Mr. GORDON. I was under the impression that under the present research and development contracts it would be breaching the contract if you let anyone look at this data without your contractor's consent.

Mr. WARBURTON. Well——

Mr. ANSBERRY. Mr. Warburton——

Mr. WARBURTON. Excuse me just one moment if I may. I would like to answer the question this gentleman asked before.

As I indicated in our statement, sir, we are very conscious of the fact that there is and has been a question as to what the Government policy should be in this area of patent rights and, again, as I indicated, we believe that the individual agency is to a great extent, if not totally, dependent upon its own determination as to which policy it feels would be best suited to its purposes.

This is the reason why we understand, historically, this policy was adopted.

I think I also should say to you that we have been attempting as well as we are able to do so, and I mean by that various public information is put out, to keep abreast of the current attitude. Thus we are awaiting the report of the task force mentioned this morning to analyze our policy on this score.

For example, I should point out to you as an illustration that our license eliminated the nontransferability provision of ASPR and also incidentally as to the foreign rights, and we do attempt to stay within the review on this.

We would appreciate some definition by the Congress.

We would appreciate some delineation by the Congress as to what the national policy should be in this area.

Mr. GORDON. Let's come back to my question. Do you remember the question?

Mr. WARBURTON. No, I am sorry I don't.

Mr. GORDON. Isn't it true that under your present research and development contracts you would breach the contract if you let anyone else look at this data without your contractor's consent?

Will you please analyze that?

Mr. WARBURTON. It is our opinion that that is not the case.

Senator LONG. Let me ask you this question. Suppose you came up with a machine that sorts mail, and I suppose you are working on that.

Mr. WARBURTON. That is really a primary objective at this stage.

Senator LONG. Now let us assume that you give a contract to somebody, for maybe a million dollars, to see if he can develop a better mail-sorting machine. Would it be beyond the realm of possibility that you would give a contract to develop that item?

Mr. WARBURTON. No, not at all.

Senator LONG. Because after all, if you could get a machine that would do the thing you would like it to do, it would be of benefit to the Government and the people.

Mr. WARBURTON. That is right.

Senator LONG. It would save many billions of dollars over a period of years.

Mr. WARBURTON. That is right.

Senator LONG. Now, if this fellow takes a contract and he is successful in developing something good, wouldn't it stand to reason that you could buy those machines through the years a lot more cheaply if he had to compete with others for the business, for their production, than if he were to become the sole supplier of that commodity?

Mr. WARBURTON. That is what we do. In sketch outline, Senator, and Mr. Robinson may desire to amplify this. I think I may truthfully and safely say to you that what we do is to search the field when we are interested in entering into a research and development contract for the purpose you have just indicated. The reason for our searching the field is to find within the experience of our engineers, and even if necessary those of other departments and agencies, the organization that seems best qualified to embark on that type of R. & D. program.

When the program has been completed and the result of it has been accepted by the Post Office Department, our usual practice is then to put it out for advertisement and bid.

Senator LONG. But you permit this fellow to have these exclusive rights to this piece of machinery which you pay him to develop.

It seems to me that you are not in any position to get competition from that point forward, that is price competition, vigorous, effective competition, to assure you the best price and the best cost on the manufacturing of it.

Mr. WARBURTON. What we do, sir, is to license the low bidder who responds to our advertisements and I think I should say to you, sir, that at the present time we are preparing a bid package upon a mail sorter that has now been completed and prototyped and has been accepted by the Department.

That bid package will go out in the next week or so.

Senator LONG. Let me see if I have this straight now.

Let's say you sign a contract for a million dollars with a man to develop a machine that will do a task that you want done. Now you don't know whether he could do it or not, but you hope he will come up with it.

Mr. WARBURTON. That is right.

Senator LONG. If I understand correctly, under that contract you will permit him to have the patent rights with the license to the Government.

Mr. WARBURTON. Which is transferable by us.

Senator LONG. Then you would have the right to transfer that.

Mr. WARBURTON. That is right, sir.

Senator LONG. But if I understand this clause you would not have the right, even if you transferred it, to manufacture this item in competition with the man who developed it to begin with.

Mr. WARBURTON. If his development is for commercial use.

Our interest in development and interest in manufacture is only for postal use and this is where we then get into the question, it seems to me, that Mr. Gordon originally raised which we indicated we were going to reconsider.

But we are talking and have based our contention on the facts that our interest has always been postal use and not commercial use.

Senator LONG. So your feeling is that the intention of your policy was that you could license anyone to manufacture this commodity.

Mr. WARBURTON. The low bidder when production is started.

Senator LONG. Against the fellow who developed it?

Mr. WARBURTON. That is right.

Senator LONG. And that he could manufacture it for you, but that he could not manufacture it for sale?

Mr. WARBURTON. That is not correct, Senator.

Senator LONG. For sale to private business.

Mr. WARBURTON. He could manufacture it for commerical sale to the Railway Express Agency, for example, as Mr. Gordon indicated a few minutes ago.

Senator LONG. Yes.

Mr. GORDON. I understand that one of your contractors, Pitney-Bowes, was charged by the Justice Department of having monopolized the production of postage meter machines and postal machinery. Is that correct?

Mr. WARBURTON. Not postal machinery, just postal meters.

Mr. GORDON. What, if any, assurance do you have that Pitney-Bowes or one of your other contractors will not obtain a patent on an item developed with public funds which will give him a monopoly of the letter or package machinery sorting business? Do you have any safeguards at all in your contract?

Mr. WARBURTON. Not as to commerical application, Mr. Gordon.

Mr. GORDON. For all you know, you could be giving somebody a monopoly in a particular field, the commercial field.

Mr. WARBURTON. We can give, under our form of contract, to the original contractor the ability under existing patent laws to practice the exclusive commercial right.

Mr. GORDON. Pitney-Bowes already has great market power in the manufacture and sale of particular items. He could certainly add to this market power, couldn't he?

Mr. WARBURTON. Mr. Gordon, let me clarify this point and then attempt to answer your question specifically.

The matter of the Pitney-Bowes monopoly on postal meters was a matter of no concern to us in this sense that we are not interested in the manufacture of postal meters because they were not manufactured for us. They are commercial items.

Any manufacturer can enter into that area and the only relationship the Post Office Department has to that particular item over which the controversy with the Department of Justice developed is that we must approve the type of meter, and I believe that we have at the present time five manufacturers whose meters are officially approved by the Department.

I want to clarify that we had no part in that particular relationship. We could not have prevented it.

I think the specific answer to your question would depend upon whether there is a commercial need or a commercial application.

Mr. GORDON. Is there or could there conceivably be commercial applications to any of these items you are having developed for Post Office use?

Mr. WARBURTON. Well, at the present time, not being an engineer, for example, I can see and I can understand that there is basically no foreseeability of a commercial application of a mail sorter that I described to the Senator a few moments ago when I indicated we are putting out a bid package on it in the next week or so.

By the same token, I think it is conceivable.

Senator LONG. It would apply to certain component parts that you develop in a mail sorter that could be used by businesses in a great number of respects.

Mr. WARBURTON. I think that is true, sir.

Senator LONG. It seems to me that especially large corporations, companies doing a mail-order business, or companies doing direct mail advertising, could find use for some of the machines that would be developed under a contract to make a mail sorter.

Mr. WARBURTON. It is conceivable. It could be an application for commercial use.

I think this is indicated by the fact, as Mr. Robinson said, that we have contractors who have filed 24 or 29 applications, whatever the figure may be.

Senator LONG. The only thought that occurs to me about it is that as a taxpayer—and I am paying your salary and helping pay my own in some respects, and I do that when income-tax-paying time comes around——

Mr. WARBURTON. I am afraid we are both in that situation.

Senator LONG. Yes. And in my capacity as a taxpayer, I am paying for development of certain machinery.

Mr. WARBURTON. That is right, sir.

Senator LONG. Now, if this is successful and businessmen want to buy that type of machinery for use in their business to produce goods I want to buy, then the royalty fee has to be passed along to me. As a consumer, I am paying a second time, the royalty fee, on this very thing that I, as a taxpayer, have paid to develop. It just seems to me that if you recognize that the consumer is a taxpayer—and I don't know of any consumer who is not a taxpayer—failure to take patent rights to this or place it in the public domain tends to work out so that the consumer, who is the taxpayer, is paying a second time for something he has paid to develop.

Are your contracts on a bid basis or cost-plus-fixed-fee basis, or both?

Mr. WARBURTON. Our research and development contracts are on a cost-plus-fixed-fee basis.

Senator LONG. And how much does your fixed-fee average out to, what percentage?

Mr. ROBINSON. Well, of course, that is a subject of negotiation, Senator, but it ranges, I would say, from about 6 to 9 percent of the estimated cost, depending upon certain circumstances, certain considerations.

Senator LONG. Let me ask you this. If you should put in your contracts, sir, a proposal to develop a certain machine or certain type of machinery, and the Government would have exclusive patent

rights to it when it was developed, do you think that you would have any difficulty in getting large concerns like, let's say, Remington Rand, IBM, National Cash Register, people like that to bid on the machine?

Mr. WARBURTON. Senator, we have thrown out this kind of a thing, I understand, in some of our negotiations. I think I can say safely that an adverse reaction was secured, and would in the future be secured, both from big business and small business.

Senator LONG. Well now, has it occurred to you to offer such a contract like that on such a basis where you just ask one question down at the bottom, "If you are successful in developing this are you willing to turn over all rights to the U.S. Government?"

Do you think that it might be worth looking into to see if you could get a bid of that sort?

Mr. WARBURTON. I don't think that we would be able to consummate a negotiation of that kind, Senator, at the present time.

Senator LONG. Do you know what luck the Atomic Energy Commission has had with such a policy as that?

Mr. WARBURTON. No, I don't know other than that I do understand, of course, that they follow the title theory. Again, I think that there are certain aspects that they differentiate in their situations from ours, and I understand they are in an area that is substantially different from ours and apparently, as I understand it, they have an alternative policy.

I am not very clear on this and I will be quite frank to say that to you.

I understand they have a flexibility or latitude that we don't have in the Post Office Department unless we get it by negotiation.

Senator LONG. We had two small businesses—say that they are taking work for the Government without patent rights—

Mr. WARBURTON. Let me say this to you. From our standpoint, as I indicated in my statement, we would be very happy to have a Government policy on this one way or the other, and by the same token, in fact, we discussed this at the luncheon hour after we listened to the testimony this morning, anticipating that your interest would lie in this area.

We will be glad to try a negotiation on this basis, but my present prediction is that it won't be a successful negotiation.

Senator LONG. Well my guess would be this, that if you simply put these things out for bid and asked in the contract, "If you are successful in getting this contract would you be willing to turn over all rights to what you develop to the U.S. Government or Post Office Department?" My guess would be that you wouldn't have any difficulty finding plenty of people who would answer "Yes."

That would be true especially if they knew it might be a determining factor in getting the contract.

Mr. WARBURTON. You indicated in your recitation just then that we put this kind of phraseology on the contract we put out for bid. I invite your attention to the fact that we don't bid these contracts. These are all face-to-face negotiations after we have attempted to determine who we feel is the best qualified prospective contractor, you see.

So these all fall within a direct face-to-face negotiation with one contractor. We go out to bid after we have received the result of the research and development contract and have accepted the product.

Senator LONG. The complicated office machinery, let's say IBM or Remington Rand, Burroughs calculators, National Cash Register, anybody in that kind of business—the complicated technical business of machinery would probably be qualified to undertake the contract to develop the type of thing you are talking about.

Mr. WARBURTON. I would think so.

Senator LONG. And my thought is on a cost-plus-fixed-fee basis where a fellow can't lose money, where he has to make it, there is no way to lose on that, if you ask four or five different people probably one of them would say yes, he would give you the proprietary rights.

The point is that you don't know because you haven't tried.

Mr. WARBURTON. We have historically uncovered what we feel were a few true experiences and I must indicate to you, as I did when I related those circumstances earlier, that the information and detail which now exist with respect to them is basically in people's minds so we can't demonstrate this accurately. But it appears such negotiations failed.

Mr. GORDON. Mr. Warburton, I am not satisfied with this Pitney-Bowes business.

Will you please clarify this for me? Pitney-Bowes was charged by the Justice Department with having monopolized the postage-meter-machinery business.

Mr. WARBURTON. That is correct.

Mr. GORDON. Now, what relationship did you have with Pitney-Bowes? Did you give them a research and development contract?

Mr. WARBURTON. Not with respect to that item, sir.

That item is an item that was developed by Pitney-Bowes on its own, and it is a device similar to the devices that four other companies have also developed on their own, which five companies, including Pitney-Bowes, we have licensed. These companies commercially and privately manufacture a postal meter—yes, a postal meter machine which is adequate and satisfactory to the requirements of the Postal Service.

So that was not based on a research and development contract. Mr. Doyle indicated to me, and it may be of interest to you, that they and the other four licensed or approved manufacturers, rent and sell to members of the public. We have no part in that aspect of it.

Mr. GORDON. Was this secured on a competitive basis? Did Pitney-Bowes secure this on a competitive basis?

Mr. WARBURTON. Secure what?

Mr. GORDON. This contract.

Mr. WARBURTON. This item was not developed on a contract supported by the Department. There was no contract.

This was an invention paid for in development by Pitney-Bowes and by the four other companies.

Mr. GORDON. Do you have the legal assurance that if a contractor secures a patent resulting from your R. & D. funds that he will not exclude competitors from making the patented machines?

Mr. WARBURTON. No; we have no legal assurance, Mr. Gordon, with respect to its commercial application.

Mr. GORDON. In other words, you could be giving somebody a monopoly and you don't erect any safeguards against this kind of situation, is that correct?

Mr. WARBURTON. With regard to commercial application, following the theory that we do, no.

Mr. GORDON. Mr. Warburton, can you give us some information about these leasing arrangements that you have for automatic post offices?

Mr. WARBURTON. Information in what way, sir?

Mr. GORDON. As we understand it, the Post Office Department or somebody is building post offices with all kinds of automatic equipment in them.

Mr. WARBURTON. That is right.

Mr. GORDON. Are you building it yourself or having somebody else build it for you?

Mr. WARBURTON. The new postal laboratory facility as it is called at Providence, R.I., known as "Turnkey," is being developed on the basis of a contract of the Post Office Department with International Telephone & Telegraph Co. which company will be, upon the completion of the building and the complete mail-handling system, the owner of the total package, and it will lease it to the Government.

Mr. GORDON. This includes the building as well as the machinery?

Mr. WARBURTON. The total works. We took an option on the tract of land we had picked out in the New England area for the erection of this laboratory and mail-handling facility and under our contract with them, the option is assigned to them.

They purchased the option therefor, and paid the price of the land from the owners of the land.

They complete the whole installation, according to our specifications and acceptance. Then they lease the facilities in toto as the owners, to the Post Office Department, on an annual basis.

Mr. GORDON. Can you give us some idea how much this is going to cost I.T. & T. for the building as well as the machinery?

Mr. WARBURTON. No, I couldn't, but, Mr. Gordon, I would be very happy to give you a full description of this transaction, including that factor.[19]

I should also point out to you, to give a complete answer to your question because I have described only half of it, that at the present time we are engaged in negotiating a contract with the Food Machinery Corp. for the establishment of a second postal laboratory and mail-handling facility on the west coast, in Oakland, which will handle the complete bay area.[19a]

We have approached this one on the advice of the Postmaster General's Citizens Advisory Committee upon this basis, that the final result of the negotiations will be a research and development contract whose end product will be the presentation to the Post Office Department of everything that is necessary for the establishment of that facility, including building design, all the architectural and engineering work, and the total indentification of the whole mail-handling procedure, in a bid package, which will then go out on competitive bidding.

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[19] See exhibit VIII(C), p. 216.
[19a] See exhibit VIII(D), p. 217.

Mr. GORDON. Let me ask you this. Are you going to pay rental for both the building and machinery?

Mr. WARBURTON. As the end result of both of these contracts, yes.

Mr. GORDON. Was this machinery developed by I.T. & T. at Government expense?

Mr. WARBURTON. This is its own development there.

Mr. GORDON. At the end of a period the Government owns nothing. It is merely renting this in perpetuity, is it?

Mr. WARBURTON. No, the lease, as I recall, will be for a 30-year term, renewable to 50 years by two 10-year increments at the end of the basic term, with the option on the part of the Government at any time during the term or any renewal to purchase if it desires to do so.

Mr. GORDON. Why was this done this way? Was it because it was cheaper both in the short and long run?

Mr. WARBURTON. It appeared to us to be that way, sir.

Mr. GORDON. The short run or the long run?

Mr. WARBURTON. In the long run, of course.

Mr. ANSBERRY. What is the basis of the rent? In other words, what percentage of the cost of the installation is the rental?

Mr. WARBURTON. I will have to refresh my memory on those details. I didn't anticipate you would be interested in them. We will be glad to give you full details on the transaction.[20]

I must indicate, Senator, if I may, as I stated a moment ago with respect to the negotiations being conducted concerning the west coast installation, that we are right in the middle of that negotiation now. I therefore would ask your permission to advise you of its details after we have completed negotiations.

Senator LONG. Thank you so much.

(Information subsequently supplied by Mr. Warburton follows:)

EXHIBIT VIII (A)

INFORMATION SUBSEQUENTLY SUPPLIED BY HERBERT B. WARBURTON, GENERAL COUNSEL, POST OFFICE DEPARTMENT

WASHINGTON, D.C., *January 21, 1960.*

Hon. RUSSELL B. LONG,
Chairman, Subcommittee on Monopoly, Small Business Committee,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: During the course of my testimony regarding the patent rights provisions in Post Office Department research and development contracts, you requested an interpretation of the clause used by the Department. The clause in question is set out in ASPR 9–107.1 and is incorporated by reference in Post Office Department cost-plus-fixed-fee contracts in this field. At the hearing, it was suggested that the second sentence of subparagraph (b) (1) would preclude the Department from using, without payment of royalties, inventions made under these contracts.

Before discussing the main question, I would like to clear up some confusion on a peripheral matter. This is the ability of the Government to use a patented invention over the objection of the holder of the patent. Title 28, United States

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[20] Information subsequently supplied by Mr. Warburton in letter dated Jan. 22, 1960, to Senator Long:

"This rental is 5¾ percent for a period of 20 years of the estimated cost to the contractor plus a 6-precent annum return on the land value of $410,000 and $110,000 established as a property tax base in a tax escalation clause. The pro forma agreement to lease provides that costs of service and maintenance shall be considered additional rent to be paid for monthly. Based upon the contractor's estimate of costs of service and maintenance, excluding costs of fuel and public utilities, made in avance of each lease term year and approved by the Department, a fee of not to exceed 8½ percent of the estimated costs will be paid to the contractor."

Code, section 1498, authorizes the United States to manufacture or have manufactured for Government use and to use any invention covered by a patent, but allows the owner of the patent to obtain reasonable compensation. The latter cannot prohibit the manufacture or use, but is entitled to compensation. The problem presented, therefore, is whether in any case the patent owner or licensee is entitled to compensation for the manufacture or use of a "subject invention" as defined in the patent rights clause.

A well-known rule of contract interpretation is that "the principal apparent purpose of the parties is given great weight in determining the meaning to be given to manifestations of intention or any part thereof" ("Restatement of Contracts," sec. 236). Since the whole apparent purpose of each of the research and development contracts in which the patent rights clause has been used is to develop items for use in the postal service, it is clear that the courts will not construe the patent rights clause in a manner inconsistent with this purpose unless the language of the clause as a whole is not susceptible to any other meaning. From the lack of any conflict between the Government and contractors or their licensees regarding the meaning of the sentence in question, it seems clear that it has received a practical construction consistent with the views expressed by me at the hearing.

Subsection (b)(1) is as follows:

"The contractor agrees to and does hereby grant to the Government an irrevocable, nonexclusive, nontransferable, and royalty-free license to practice, and cause to be practiced by or for the U.S. Government, throughout the world, each subject invention in the manufacture, use and disposition according to law, of any article or material, and in the use of any method. No license granted herein shall convey any right to the Government to manufacture, have manufactured, or use any subject invention for the purpose of providing services or supplies to the general public in competition with the contractor or the contractor's commercial licensees in the licensed fields."

As will be seen from the language, the Government may be liable to pay additional compensation to the contractor or his licensee when it manufactures or has manufactured or uses subject inventions covered by the contract "for the purpose of providing services and supplies to the general public in competition with the contractor or the contractor's commercial licensees in the licensed fields."

Since no statutory or other technical usage is involved, there is no reason why the word "competition" in the quoted phrase should not be given its plain and normal meaning in accordance with the basic rules of interpretation of written contracts ("Restatement of Contracts," sec. 235(2)). Competition in the context of providing services and supplies to the general public implies business rivalry, "the play of contending forces ordinarily engendered by an honest desire for gain." *U.S.* v. *American Linseed Oil Co.* (262 U.S. 371). Competition has also been defined as the "effort of two or more parties, acting independently, to secure the custom of a third party by the offer of the most favorable terms. It is the struggle between rivals for the same trade at the same time; the act of seeking or endeavoring to gain what another is gaining at the same time." *Lipson* v. *Socony Vacuum Corporation*, 87 Fed. (2d) 265, 270. Applying these definitions, the quoted language would appear to mean that the Government will not have the benefit of its royalty-free license if it seeks to use a subject invention in business rivalry with the contractor in the commercial market with the aim of obtaining the trade of the public at the expense of the contractor and realizing a profit thereby.

Further, the restrictive language of the second sentence of subparagraph (b)(1) must be interpreted in relation with the first sentence, which is the basic grant of broad license rights, so as to give reasonable meaning to both sentences and effectuate the main purpose of the contract ("Williston on Contracts," sec. 619). The restriction imposed by the second sentence, in the absence of clear indications to the contrary, should not be interpreted so as to nullify the affirmative license grant, which must be considered as intended to convey real rights and not illusory ones. Thus, where a governmental function, even one of service to the public for fees, is well established, and a research contract is entered into in aid of that function, it would seem to require more explicit language that is presented here with regard to the restriction on competition to hold that the license rights conveyed under the contract were not intended to be sufficient to permit the subject invention to be practiced in carrying out that function without further payment. What does seem intended by the restriction is that

the Government may not enjoy its royalty-free rights in such competitive activities against the contractor or the contractor's licensees as were not within the contemplation of the parties and main purpose of the contract at the time the contract was written.

This construction seems entirely consistent with the apparent purpose of the division of rights provided in subparagraph (b)(1), which, while granting to the Government a broad license in a subject invention, purports to reserve title to the invention in the contractor. The potential value of exclusive rights in areas outside known governmental activities would seem to be one inducement, presumably reflected in the consideration, which might otherwise be higher, for taking and performing the contract. The value of such rights would naturally be questionable were the Government, with the power in its license to have anyone practice the invention on its behalf, including dispositions (e.g. sales) authorized by law, able to engage royalty free at some later time in rival commercial activities which would place the contractor and his licensees at a commercial disadvantage. Since under the first sentence of subparagraph (b)(1) the Government's license is unrestricted, except that it is nontransferable, the contractor would understandably seek some restriction to protect the value of his potential patent rights in the commercial sphere, without defeating the Government's basic license powers in aid of its own traditional functions.

You also requested information regarding patent applications filed by contractors and patents obtained by them. In addition, you requested information regarding Project Turnkey at Providence, R.I., and Gateway at Oakland, Calif. Statements regarding these matters are attached.

Sincerely yours,

HERBERT B. WARBURTON,
General Counsel.

EXHIBIT VIII (B)

Patent applications or patents on subject inventions under Post Office Department research and development contracts

Contractor	Title of invention	Application No.	Patent No.	Date filed or issued
Reed Research Corp	Optical photoelectric sensor	460,285		Oct. 5, 1954
Pitney-Bowes, Inc	Mail conveying device	786,134		Jan. 12, 1959
	Code element shifting device	800,891		Mar. 20, 1959
	Binary coded track	827,066		July 14, 1959
Emerson Radio & Phonograph Corp.	Letter feeder (streamflow)	683,284		Sept. 11, 1957
	Letter feeder	684,800		Sept. 18, 1957
	Stamp sensing and canceling apparatus.	686,529		Sept. 26, 1959
	Vacuum belt shingler and feeder unit.	696,393		Nov. 11, 1957
	Letter feeder and multiples eliminator.	700,051		Dec. 2, 1957
	Mail canceling apparatus and the like	700,860		Dec. 5, 1957
	Time stamp changing mechanism for mail canceling systems and the like.	700,861		Do.
	Mail handling apparatus	724,646		Mar. 22, 1958
	Mail handling apparatus (electronics).	732,330		May 1, 1958
	Mail culling equipment (key ejector).	705,861		Dec. 30, 1957
	Mail culling equipment (corrugated, chute, gaging belt arrangement).	705,872		Do.
	Mail culling equipment	706,118		Do.
Rainbow Engineering Co., Inc.	Mechanical coding and sorting device.		2,901,089	Aug. 25, 1959
	Differential pressure envelope printer.		2,901,969	Sept. 1, 1959
	Stacker for mail sorters and the like.		2,904,335	Sept. 15, 1959
	Code printing and sorting station for mail.		2,912,925	Nov. 17, 1959
	Single letter feeding device	810,941		May 4, 1959
	Optical systems	665,763		June 14, 1957
	Photoelectric keyboard	810,940		May 4, 1959
	Magnetic recording on pieces of mail and the like.	810,760		Do.
Nuclear-Chicago	Information coding and sensing	800,554		Mar. 19, 1959

EXHIBIT VIII (C)

PROJECT TURNKEY (I.T. & T.) PROVIDENCE, R.I.

On February 3, 1959, the Post Office Department accepted a proposal made by Intelex Systems, Inc., to contract and equip, at Providence, R.I., a building which would be rented to the Department.

The proposal was in the form of a letter of intent to which there was attached a pro forma agreement to lease and a pro forma lease.

The following taken from the letter of intent describes the scope of the project.

"In pursuance of our 'Project Turnkey' proposal dated October 1, 1958, discussed with you, the Postmaster General, and your associates at the meeting of October 9, as revised December 2, 1958, and subject to your acceptance of this letter of intent within 30 days of this date, Intelex Systems, Inc., proposes to proceed with acquisition of the agreed site, or an interest therein sufficient to carry out the purposes of this letter of intent, following your assignment to us or our designee of the option to purchase executed by the Providence Redevelopment Agency on or about December 11, 1958, which embodies the provisions of form H–6209 with respect to clearing, grading, and demolition of existing structures by that agency. In the event Intelex Systems, Inc., does not acquire good and sufficient title to or interest in the premises, including proper zoning if necessary, no liability is to be imposed on the Post Office Department for any costs of any nature whatsoever incurred by Intelex under this letter of intent. However, in case Intelex desires to proceed with action toward implementing the further matters hereinafter set out prior to acquiring good and sufficient title, and proper zoning, it shall do so at its own risk. Upon acquisition of title to or a sufficient interest in the aforesaid premises, Intelex proposes to:

"1. Proceed without delay with the detailed engineering of the buildings and equipment for 'Project Turnkey' as more fully described in the aforesaid proposal to the U.S. Post Office Department, 'Project Turnkey,' dated October 1, 1958, as revised December 2, 1958, and with such further modifications therein as may be mutually agreed. By 'Project Turnkey' is meant the complete Providence experimental mail processing plant to be constructed at the agreed site situated between West River Street and Corliss Street at or near the junction with Charles Street, in the city of Providence, R.I., and comprising the land, buildings, and equipment appurtenant thereto, fully installed and ready to function at the time of delivery to the Post Office Department for operation.

"3. Proceed with such design, prototype, construction, and operational testing of certain functional 'Project Turnkey' equipment as may be necessary.

"4. Proceed with the design of the power and free conveyor, the manufacture of a prototype length of such conveyor and its testing under operating conditions with the assistance of the Post Office Department.

"7. Make commitments for the construction of the necessary 'Project Turnkey' buildings, following preparation of the site by the Providence Redevelopment Agency, including arrangements with the supervising architects and engineers.

"8. Draft and propose, for acceptance by the Post Office Department, preliminary descriptive plans and specifications, terms and conditions for 'Project Turnkey,' based upon the engineering, design, testing, and other studies and arrangements referred to above. By 'preliminary descriptive plans and specifications' are meant those drawings and specifications which describe the real estate, its improvements and structures thereon, and the machinery and equipment to be provided, all in sufficient detail to give a clear understanding of the size, layouts, space allocations functions, workflow and capacities of the facilities which Intelex proposes to furnish.

"The agreement to lease will be executed as soon as the Post Office Department and Intelex Systems, Inc., have agreed upon preliminary descriptive plans and specifications for 'Project Turnkey,' and will be drawn up substantially in accordance with the pro forma agreement annexed to and forming part of this letter of intent with such modifications as may be reasonable and necessary to conform to the agreed preliminary descriptive plans and specifications, terms, and conditions for 'Project Turnkey.' Intelex Systems, Inc., further agrees to have such preliminary descriptive plans and specifications completed within 60 days after acceptance of this letter and intent by the Post Office Department, and will commence construction not later than 30 days after the agreement to lease has been executed by both parties.

"The lease will enter into effect upon completion of 'Project Turnkey' and delivery of the said facility to the Post Office Department for operation, and will be executed as of that delivery date and as soon as possible thereafter, substantially in accordance with the pro forma lease annexed to and forming part of this letter of intent, with such modifications as may be reasonable and necessary to conform to the aforementioned agreed preliminary descriptive plans and specifications, terms and conditions for 'Project Turnkey'."

The annual rental for the building completely equipped with modern automatic and semiautomatic mail handling equipment subject to adjustment upon execution of the lease is $1,440,000.

EXHIBIT VIII (D)

PROJECT GATEWAY, OAKLAND, CALIF.

The Post Office Department has embarked upon a research and development project at Oakland, Calif.

The Post Office Department in furtherance of its program to improve the postal service and to mechanize postal operations to the fullest practicable extent plans to establish at Oakland, Calif., a fully mechanized experimental post office, including a fully integrated mail processing system. The system and equipment will be housed in a building especially designed for this highly mechanized and systematized operation. Special consideration will be given to the economy and efficiency of operations and to service to the public in the formulation of the system and in the design of the equipment and building. The building will be constructed and equipment will be furnished with private capital and leased to the Department.

The project is planned in steps, each step covering a specific time period. Two time periods are presently contemplated. The first will end on March 31, 1961, and the second on March 31, 1964.

(*a*) During the first period the objective is to make operational analyses and determine the kind of machinery and equipment to be incorporated in the mail handling processing system; design, develop, and build individual experimental models of such machinery and equipment as may be required and test such equipment for operational efficiency, durability, and maintenance requirements; integrate the developments of the total machine program into a complete mail handling processing system; engineer the component machinery and equipment for production as required; estimate the cost of equipment in place; estimate approximate machinery and equipment maintenance costs; establish the processing rates of each machine and/or manual method, space, size, and configuration requirements of the building which will house the complete mail handling processing system.

A final report on the foregoing will include firm recommendations regarding types and amounts of training equipment to be designed, developed, and/or procured.

(*b*) Upon recommendation of the contractor the Department will secure the services of a qualified architect-engineer for the purpose of performing the work necessary to produce the plans and specifications for a building to house the experimental system. The plans and specifications developed will be in such form that they may be used for the preparation of advertisments upon which competitive bidding may be had for the construction and leasing of the fully equipped building including the machinery for the mail handling processing system.

During the second time period the Department will enter into an agreement to lease the fully equipped building. It will also enter into a fixed price contract or contracts (assignable by the Government to the lessor) to purchase and/or manufacture and install the mail handling and processing system developed as the result of work accomplished in the first time period. The Department will require that its contractor test, check out, and correct the equipment, train postal employees, and provide operating procedures, schedules, other materials, and devices to insure the greatest possible efficiency and service from the equipment and system, for a period of 1 year from the date of the beginning of the full operation. "Full operation" shall begin when the contractor has installed all postal equipment for which the facility was designed.

The contractor will also maintain the equipment and replace such equipment as required to provide machine and equipment output at the levels designated during the trial operation of 1 year. As a result of 1 year of trial operation, the contractor will enter into a separate agreement (assignable by the Government to the lessor) to maintain the mail processing system and all equipment related for the full term of the lease of the building.

A contract has been negotiated with Food Machinery & Chemical Corp. of San Jose, Calif. The contract is a cost-plus-fixed fee and covers only the work to be performed prior to March 31, 1961. The estimated cost for the work called for is $3,017,501. The fixed fee to be paid is $147,390.

I believe Prof. Seymour Melman has to go back to New York and I think we had better hear from him now.

STATEMENT OF SEYMOUR MELMAN, ASSOCIATE PROFESSOR OF INDUSTRIAL AND MANAGEMENT ENGINEERING, COLUMBIA UNIVESITY, NEW YORK CITY

Senator LONG. Professor Melman, I believe your statement is fairly brief compared to the others and I suggest that you simply read your statement and we will ask you questions on it.

Mr. MELMAN. My name is Seymour Melman. I am associate professor of industrial management engineering, Columbia University. I engage in research and teaching on problems of industrial productivity and industrial operations.

I believe I come to the present hearing as a consequence of having served as a consultant 2 years ago to the Subcommittee on Patents, Copyrights, and Trademarks of the Senate Committee on the Judiciary. I prepared a monograph entitled, "The Impact of the Patent System on Research." It is study No. 11 of a series by that subcommittee and forms the basis of the material that I have prepared for this hearing.[21]

May I respectfully call this monograph to the attention of this body as indicating a series of, in a sense, basic research data that bear on the testimony I am about to give?

Senator LONG. Thank you. I am sure it will be very helpful to the committee.

Mr. GORDON. You have also written other books, haven't you? Have you written a study on productivity?

Mr. MELMAN. Yes, I have done several books. The titles include: "Dynamic Factors in Industrial Productivity," and "Decision Making and Productivity." A year ago I was editor of a volume on "Inspection for Disarmament."

During the last year and a half I have been studying the problems of the producers goods industries, notably machine tools in the United States, Western Europe, and the U.S.S.R. While in Russia I had the interesting experience of meeting with a number of technicians and similar people in research institutes during August and September of this year. I would be glad to make reference to that if the Senator believes that that might be of interest.

Senator LONG. Have you been employed by private concerns to make studies in any of these fields?

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[21] "The Impact of the Patent System on Research"—Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Senate Committee on the Judiciary (study No. 11), 85th Cong., 2d sess. Copy retained in committee files.

Mr. MELMAN. I have been employed and am employed from time to time as a consultant by management of industrial firms.

Senator LONG. Thank you.

Mr. MELMAN. This statement is entitled "Are Property Rights in Knowledge an Incentive to Research."

How does the taking of a property right in knowledge affect the performance of research by which knowledge is produced, and applied to particular designs? This problem underlies an important part of the legislation that is before this committee.

In a study carried out in 1958 for the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on Judiciary of the United States Senate ("The Impact of the Patent System on Research") I found that, on balance, the taking of a property right to knowledge, in the form of a patent, tends to have a negative effect on the promotion of science and the useful arts. This inference is relevant to the deliberations of this committee. The exploration of space for example, with which the Federal Government is concerned, surely requires the collaborative development of all the physical sciences, and the application of new knowledge to elaborate designs.

It cannot be denied that the opportunity to take a property right in knowledge in the form of a patent, and to gain monetarily from it, may have some effect as an incentive in inquiry. The problem involved here, however, is not this one. It is rather: Does the opportunity to take patents, and the actual record of patent-taking, demonstrate that the patent system has had a major incentive effect on the production of new knowledge and its application?

The opportunity to take a property right in knowledge has not functioned as a major incentive in basic science. There, the major incentive has been the creative sense of the scientists involved, and the resources made available to them to pursue the work of inquiry in a free atmosphere. This is the basis for the operation of inquiry in nonprofit institutions like the laboratories of universities, Government, and private foundations.

The taking of a property right in knowledge has had a negative effect on research in a number of universities where patent incentives had been introduced as an adjunct to research operations. In these cases the quest for knowledge as an end in itself, and the free operation of imaginative inquiry, was channeled and restricted in the interests of carrying out research that would yield commercially useful knowledge. By this token, the unrestricted scope for imaginative application, that comes from the use of knowledge as an end in itself as a research criterion, was abandoned in favor of a more restricted, limited yardstick for gaging what is relevant for inquiry. The effect in these cases was also to detract from the quality of the work done.

Contrary to popular understanding, the facts of the case appear to support the proposition that the taking of a property right in knowledge has not served as a major incentive in the expansion of industrial research. A number of industries have operated extensive research and development facilities without active patent policies. The case of the automobile industry is to the point. As a general rule, in manufacturing industry as a whole, there has been a rapid expansion

of industrial research activity during the last 30 years. At the same time there has been a relatively stable level of patent-taking. Clearly, it cannot be argued that the opportunity to take patents has served as a major incentive for the performance and the expansion of research by industrial firms. If that were indeed the case then one would expect to find some parallel development in the number of patents taken, commensurate with the money spent for research, and commensurate with the number of engineers and scientists engaged in the laboratories of industrial firms.

It is possible that during the 18th and the early 19th centuries the opportunity to take a property right in knowledge had rather more of an incentive effort than is currently the case. At that time research and application was more the work of individual persons (inventors) than it is today. During the 20th century the development of inquiry has increasingly been toward collaborative work, involving division of labor and the cooperative activity of persons in very many fields of specialization.

For the present purpose, it is important to reflect on the question: How does the mode of control over research and the disposition of new knowledge affect the efficiency of research effort? For this problem it is useful to estimate the research efficiency of men who operate under two different orientations: first, those who act on behalf of the whole society in their work. In that case, the research criterion is knowledge as an end in itself. The men so guided are not limited in the scope of their search for new knowledge by the particular requirements of any one unit or section of society.

Another possible orientation in research is activity on behalf of the interests of, say, a particular firm. In that case the special, defined interests of the firm, as against other firms, must be a guiding criterion. These different vantage points affect the scope of inquiry, the readiness to publish research findings, and the ability of investigators to cooperate freely with other men doing parallel and related work in other laboratories or institutions. Who will be freer to explore the frontiers of knowledge? Who will more readily publish and circulate new knowledge? Who will be more daring in the application of knowledge to new designs—the men who act on behalf of the restricted goals of a single firm, or those who act on behalf of the goals of a whole society?

In my opinion, it is the men who are empowered to act on behalf of the wider interest who will be least encumbered, and thereby more efficient, in the conduct of inquiry.

In my judgment, the motivation of service to the community is a powerful force, and when harnessed can produce a great outpouring of creative energies. It is not to be denied that the motive of personal gain or of profit for a firm can also function as an incentive. The difference is clearly that the incentive for private gain has a restrictive effect in the conduct of inquiry and in the disposition of research results.

The vast scope of inquiry that is required for the exploration of space, for example, justifies attention to a broad view of alternative methods for organizing research.

The reasoning that has been summarized here (drawn essentially from the monograph "The Impact of the Patent System on Research")

is that greatest efficiency in the conduct of inquiry and the efficient application of results, derive from the use of knowledge as an end in itself, as a major criterion for research. Again, by similar reasoning, the knowledge that is thus produced is best available when located in the public domain. If the requirements of other legislation, and of various substantive considerations not known to me, dictate the need for some mode of property right to knowledge, then the reasoning used above suggests the importance of locating this property right in an institutional framework that represents not a particular section, but society as a whole. The Federal Government can function as such an agency.

Senator LONG. As I understand your position, professor, it is your feeling that when a Government pays for research they ought to take title to what was developed under it.

Mr. MELMAN. That would be my inference, sir, from the study that I have performed with respect to the effectiveness of alternative modes of organizing research, organization and application.

Senator LONG. Now, of course, if I understand you correctly it would follow from your statement that you believe the idea would be not to have a patent system.

Mr. MELMAN. The crucial problem here, as I see it: What weight should be given to alternate ways of allocating resources for research and for application in the light of these findings?

I would say that the inference from my findings is that the widest public interest would be served in giving increasing weight toward locating both basic research and application in the public domain. Similarly, the results of Government-sponsored research ought to be disposed of in a manner consistant with these criteria.

In our society we have a variety of institutional arrangements under which research and design is carried out. For the purpose of legislation, the suggestion that emerges is that increasing attention be given to locating the application of Government resources where they would yield the greatest return for the society as a whole.

Senator LONG. It does seem to me that when you are fighting a war and our national survival is depending upon it and we throught that we better see how we could break the atom and explode the atom and make the atomic bomb, recognizing that we would lose the war if the other fellow got there first, if you have some patent, why that's too bad and the Government is going to take all of those rights if it had anything to do with atomic energy and proceed on that basis to go right ahead and develop the atomic bomb in the most rapid way possible.

Of course, we were fortunate to have it first though.

Where do you think we stand as compared to the Russians with regard to the development of intercontinental ballistic missiles, or outer space vehicles?

Mr. MELMAN. Sir, I am not able to give expert testimony on that question.

Senator LONG. Did you know that Mr. Von Braun testified before the Johnson Preparedness Subcommittee that if the Russians stop right now it would take us 3 to 5 years to catch up to them?

Mr. MELMAN. Yes, sir; I know of that testimony.

My comment was addressed simply to my own experience, and I indicated that from observations I had made directly, that I am not able to testify to the particular point you raise.

However, sir, may I speak of a related point? I have listened to the reasoning that holds that private firms ought to be allowed to take property rights in knowledge that is patentable and that arises during the course of their performance of work under Government contract. The claim is that having such a right would serve as an important incentive to those firms.

May I suggest, sir, that exactly the same reasoning could be extended to the proposition that individual employees of firms ought also, if that reasoning is regarded as valid, be allowed to take exclusive property rights to the knowledge which they developed while in the employment of firms, because that would give them certain incentive.

However, firms have discovered and have applied the understanding that collaborative work in inquiry and not the divergent, competitive activity that builds walls between investigators and cuts off the flow of knowledge, is what leads to efficiency of research. Therefore, within the framework of firms, they try to see to it that research is organized, administered and operated to secure a flow and exchange of knowledge within the laboratories concerned.

If, sir, the same line of reasoning that is argued in behalf of the special property right for private firms were applied to their own employees—individuals, though not corporate individuals—then the result would clearly be a chaotic result with respect to efficiency in the performance of inquiry. Just as an individual firm finds it efficient to give a group incentive for the performance of inquiry, so the whole society, by similar reasoning should find it efficient to give a society-wide incentive.

The logic for a society-wide incentive stems from the fact that no section of society, no unit, no firm, no single Federal agency, is able to prescribe within its boundaries the total range of research activity that is required to nourish and support the particular research that it is concerned with. In inquiry no one can stand alone. Thus, firms draw upon all knowledge that is available in the public domain, and they claim a reasonable right to do so. But then they turn about and claim, with other reasoning, the right to restrict the disposition of that knowledge.

Indeed, my observations with respect to these modes of performance are most striking.

In the case of a major laboratory, important in its own right, I found that the intake of knowledge was characterized, for example, by the fact that this firm employed several thousand investigators, and had its own elaborate library facilities. In addition, however, the firm operated bibliographic services, extracting scientific information from several hundred journals.

They were dissatisfied with the generally available abstracting services, for by operating their own service they saved two weeks' lead time as against the publicly available abstracting services. In order to save 2 weeks, they operated a rather expensive facility to do this technical bibliographic work.

However, on the outgo of knowledge from this firm, what I found was the following: Taking the papers published in the scientific lit-

erature by employees of the laboratory during the last 5 years, the laboratory director advised that there was a period of 3 to 5 years that intervened between the private circulation of these research reports inside the firm and the public availability of these reports.

In a word, for acquiring new knowledge, it paid them to make a large outlay to gain 2 weeks. To have knowledge go out, there was 3 to 5 years delay period for that knowledge which was released.

I find that this kind of performance, while perfectly plausible, reasonable, from the standpoint of the interests of a private firm, is surely not the kind of performance which leads to effects in research and application that is to the benefit of the society as a whole.

The Federal Government is engaged in many programs of research, many of which are oriented toward objectives in which the whole society and not particular firms are involved.

Senator LONG. Let me ask you a question as a practical matter.

We had witnesses for a corporation today, very able men and very respectable people. It appears that on Government research and development—this firm by the way is Lockheed—this year they will have $400 million in contracts which will provide an estimated 7-percent profit. There would then be a profit before taxes of $28 million. Government work is 45 percent of their overall business. Do you think that if the Government would insist on having all the patent rights on that Polaris missile they would turn over those patent rights or else they would have to give up the contract?

Mr. MELMAN. Sir, there is a new problem here, and that is: What is the motive for the operation of industrial firms? I have understood that it was the opportunity to make a profit that excited a firm to action. In the reasoning that you just alluded to it is implied that something else is now demanded as a requirement; namely, an opportunity to take a property right in knowledge, the production of which has been paid for expressly under contract with another party, in this case the Federal Government. That is a remarkable phenomenon.

I don't believe that the granting of such property rights is a necessary condition for the performance of competent, technical research in this society.

Senator LONG. It seems to me that if the public is going to pay a single contractor $400 million a year out of which he is going to make $24 million, and that when the public in general pays all that money, it is asking a little bit too much for him to request that he have exclusive rights to that property and knowledge.

Mr. MELMAN. I have heard comment elsewhere to the effect that, somehow, in the absence of granting the special property rights under discussion here, the all-out energies of the contracting firms would not be available. Hence it was implied that the ordinary ability to earn a profit under a contract, on a cost-plus basis, was not a generous enough return for the initiative of management and for compensation to the scientists and engineers involved. Broadly speaking, scientists and engineers are now salaried employees and they perform their work with a degree of efficiency that is not necessarily based on a given level of monetary reward. Accordingly, the scientists and engineers involved do not have an incentive in the form of increased income to them from any additional ingenuity that they might exercise in the performance of their work.

The management might have certain additional properties to dispose of, but the men doing the technical work do not derive any extra benefit from it.

The claimed need for additional incentive is a line of reasoning that comes from managements who imply that they are reluctant to issue a decision to go ahead to scientists and engineers unless the management is given the opportunity to reap a substantial reward over and above what apparently is agreed to be a fair profit.

It is also implied that the motivation for research and development, that lies in service to a community as a whole should be disregarded as ineffectual. I wish to challenge any such assumption. I know of no more powerful motivation, no more powerful drive to evoke creative energies of men than the sense of doing useful work on behalf of a large community, and being recognized in doing that work.

May I point out, sir, that during a visit to the U.S.S.R. this summer, including a visit with the technicians of a rather important laboratory in Moscow area, that I never once heard of any research being described as being done in the interest of this section of a laboratory, in the interest of the whole research institute, or in the interest of a particular industry toward which some of the work was being oriented.

Rather, I heard from these men that their effort was oriented toward the whole team, the society as a whole, to overtake the United States. The conception was that everybody was doing his little bit and pulling together.

Some of the testimony that you have alluded to, sir, refers to the proposition that only when we pull apart are we able to be efficient in research; only when one seeks special, private differential gain, as against other persons, is one able to conduct inquiry effectively. That kind of proposition is not supported by the evidence available to us on the characteristics of efficient performance, either of basic or applied research.

Mr. ANSBERRY. Mr. Melman, on your trip last summer when you had access to these Russian laboratories, did you find that Russian scientists are extremely well paid for their discoveries?

Mr. MELMAN. Extremely?

Mr. ANSBERRY. Extremely well paid compared to the other members of the society?

Mr. MELMAN. That is correct, sir. The differentials in salary that prevail there are considerable, for example, as between industrial workers and persons who do technical research.

The Government, and also the ordinary citizens that I met place great importance on the performance of this research. It is regarded as the spearhead of the national effort for industrialization, for becoming a thoroughly modern industrial society. The monetary incentive, however, is not to be regarded as necessarily the central incentive.

The men who perform this work enjoy a high status in the community which is noticed at every hand. You have only to walk the streets and you see evidence of it on posters, newspapers, in radio announcements, in the kind of material that is exhibited in the permanent fair outside of Moscow that is called the Permanent Exposition of Soviet Economic Achievement.

I am unable to sympathize with the reasoning that begins with the assumption that only by unlimited private gain is it possible to induce effective performance of inquiry, or effective application of knowledge to new designs.

Any person can independently examine the relevant facts of the case as I attempted to do in the monograph on behalf of the Subcommittee on Patents, Copyrights, and Trademarks.[21a]

Senator LONG. Here is a thought that occurs to me on the subject.

Our original patent laws were based on the theory that to encourage people, especially at an early stage of the development, to go forward and develop something—the Thomas Edison type of thing—that if a man were to develop something, we would give him a patent. That was an incentive for everybody to see if he couldn't improve society, just like developing something useful and getting a patent on it. That was his pay.

At that time there was no other pay that he could rely upon.

Well, subsequently, of course, the society became more complicated and we got to the point where this Government is now paying $8 billion a year for research and the patent policy is no longer recognized.

Once you reach that point I believe it should be somewhat in the line that you say, how, by spending this activity, can we get the best results?

Do we get the best results by encouraging everybody to separate himself from the other fellow and keep the stuff secret from his competitors or get better results by making this information available so somebody can stand on the other man's shoulder and make the next development?

If we approach it from that basis it would appear to me that our present policy is certainly not helping much along that line. It may be. I haven't heard the information yet.

Do you see any way that by compartmentalizing research into separate companies, with patent advantages for each individual company, we are hastening or advancing research?

Mr. MELMAN. The inference from the studies that I have done, sir, would be that the negative effect would result. The more one leans to a policy of giving segmented property rights in new knowledge or its application, the more one erects barriers to efficient performance of inquiry, to the disposition of knowledge that results therefrom to the efficient application to designs. People who produce new knowledge or new designs which may be the substance of patents are now mainly salaried employees. They may receive certain modest recognition in addition to their salary for having their name on a patent. However, their salaries are, in the main, their source of income.

Secondly, technical research and design work are rarely carried out by individuals acting alone. I made an effort in this monograph to review the mode of performance of various types of inquiry, both in basic science and in application. I found that, in each instance, the work was collaborative in character; that in fact, the direction of

[21a] Committee print issued by the Subcommittee on Patents, Trademarks, and Copyrights of the Senate Committee on the Judiciary entitled "The Impact of the Patent System on Research" (Study No. 11), 85th Cong., 2d sess. Retained in committee files.

development is such as to make it increasingly difficult to designate a particular inventor. Indeed the term "inventor," the stock and trade of the system of rationalization for the patent system, tends to become an obscure and odd term.

When does a scientist or an engineer become an inventor? Apparently, this happens when he seeks to take a patent right. Until then, he is a scientist or engineer. He performs creative activity in a necessarily collaborative way. He cannot shut himself off from other persons and perform creative activity in such isolation that would justify the designation of a particular person, or even a small group of persons, as being the responsible persons for a particular new invention or particular new design.

Instead, as I attempted to point out in detail, through investigation of varied research and design efforts, the persons engaged in these efforts, draw upon a great variety of knowledge from other people as necessary adjuncts to the performance of their work.

The whole character of research is one in which there is now a great division of labor. Present-day inquiry and design calls for collaborative activity on a large scale. This applies to individuals, to institutions, to departments of Government. And it applies to firms as well.

It is common knowledge, for example, that engineers and scientists employed by private firms do everything they can to acquire as rapidly as they can, the new knowledge that is the public domain. They participate in learned societies and the like. They examine the literature, as I indicated before, and they make considerable efforts to make more efficient the intake of new knowledge which they indeed need.

Well, my point is that others also need new knowledge. For greatest efficiency in dissemination of new knowledge and its application, it is best that knowledge be in the public domain.

From that standpoint, the patent system, which sets up an interest and property of an exclusive sort, is deleterious to the promotion of science and of the useful arts both.

I am familiar with the lines of reasoning that underlie the justification of the possible usefulness of a patent system. However, in response to this kind of rationalization, I have attempted to present the facts of the case that bear on each question.

Is inquiry performed by individuals or small groups so that it is possible to indentify an inventor? To that problem I have addressed a series of data which can be verified.

Have patents served, indeed, as incentives to industrial firms in the performance of industrial research? To that question I have submitted, not further argument or rationalization, but an examination of the facts of the case demonstrating the relation of expenditures and activity in research, and activity in patenting.

Has the introduction of the opportunity to take a private property right, where it was not available, served as an incentive to research? To that question I have again submitted a body of data that bears on the point, and which shows that the introduction of the property right is deleterious.[22]

[22] See exhibit IX, p. 231 (excerpts from pp. 27 to 37) of "Impact of the Patent System on Research."

In a word, I have attempted in this monograph to address myself to the underlying questions that pertain to the reasonableness of having and using a patent system, and relying on a patent system as a major device for promoting science and the useful arts. I underscore the term "relying."

If one wishes to debate this matter, one should address oneself, in my opinion, as I have, to the facts of the case. Surely there is subject matter to be debated here. Surely my inquiry did not dispose of the whole matter.

Nevertheless, the data that I have collected is clearly in the direction of indicating that the patent system no longer serves, in the mid-20th century, the avowed purpose for which it was designed in the latter part of the 18th century.

Mr. GORDON. Professor Melman, will you please say a few words as to the relation of the present system with respect to economic growth and the growth of monopoly.

Mr. MELMAN. As to the growth of monopoly I can only indicate——

Mr. GORDON. That is, the type of policies that some of the Government agencies have today of giving up title, and also the matter that you are talking about, that of knowledge and its relationship to our country's economic growth. What kind of a system would be, perhaps better to accelerate the rate of economic growth?

Mr. MELMAN. In my view, sir, it is almost self-evident that a change in policy, in the direction of systematically granting the opportunity to property rights in knowledge to private firms would give a major advantage to the larger firms. They are the ones under whose direction both research and application to new design are concentrated in industry. An advantage to them would flow automatically from the present distribution of research facilities in industry. Granting the opportunity to take patents on work done under Government contract the managements of these firms would accelerate the pace of the processes that are termed "concentration" or "monopoly".

Now, as to the matter of growth—If one agrees that the promotion of science and the useful arts is at the root of industrial development, then surely the society ought to seek out a direction of action which promotes science and the useful arts. The patent-taking policy and the whole view of exclusive rights to knowledge and design has increasingly failed of that purpose in the middle twentieth century. Accordingly, new policies are required. Such policies must, in the larger interest of economic growth, facilitate the application of resources to basic research and to application of that research. As to application: we have quite an activity located especially in private firms that is well-equipped to conduct work of application of knowledge to new design.

While the area of basic research deserves more resources, it is the absence of means for speedy application of new knowledge to new designs that is often an important deficiency.

Owing to extensive division of areas of control over inquiry, and over disposition of knowledge, we have barriers to the disposition of knowledge and to the ability to apply it to new activity, to new design.

Hence, the direction of policy for more efficient application of basic research to new design is one which, again, calls for breaking down these barriers.

Immediately one recalls the proposition that, perhaps, there may be a lessening of incentive to do research precisely among these major firms, who now dominate in many industrial fields, if they were not able to take a property right to knowledge. Would they do less research in application, or would they do less research of a more basic sort?

As to the basic research: Private firms now do very little basic research, some 4 percent or thereabouts of their research budgets being so applied. It is rather with the area of applied research that we might be concerned. There we have a bit of evidence which, in my opinion, is useful for analyzing this matter.

About a year ago, as a result of some antitrust action, a number of firms, I.B.M. Western Electric, had various of their property rights in patents substantially abridged.

Mr. GORDON. They had to open up, didn't they?

Mr. MELMAN. That is right; and a very interesting event took place at that time. A man who qualified as an expert in the patent system, Mr. Richard Spencer, a member of the New York Bar, and onetime First Assistant Commissioner of Patents, wrote in the Wall Street Journal of April 10, 1956:

> A.T. & T. and I.B.M. are the great pioneers in research and invention in their industries, which accounts for their leadership and their strong patent positions, as well as for the fact that they were selected as defendants.
>
> Under the decrees not only have their long-established methods of doing business been disrupted which will interfere with efficient operation for years to come, but management will no longer be in a position to authorize the expenditure of millions of dollars in the development of new commercial products and processes, since competitors would be free to copy them.
>
> These same companies are also leading contributors to the national defense efforts. Disruptive influence in their business will be reflected in that effort.
>
> More importantly will be the further retardation of invention in two such vital fields as electronics and computers, both of which are of critical importance to atomic energy, aircraft, and guided missiles.

I put it to you, sir, that this is a clear and an eloquent argument as to the consequence of an abridgment of patent rights on research effort.

Upon the appearance of this opinion I took counsel with the chiefs of research in the corporations in question. I discovered from them that not only would there be no stabilization or retardation of their research efforts, but that there was, in fact, a major expansion of their research programs underway.

Immediately one must ask: What then is the motivation for the performance of industrial research by these firms if it is not the motive which was ascribed to these firms by Mr. Spencer, the opportunity to hold patent rights? In my judgment, the primary motivation is the desire of the managements of these firms to preserve a strong position in the technologies with which their firms are concerned.

The problem of firms is not to hold on to an existing stock of knowledge or designs. In order to hold leadership in a given state, in a given area of the industrial arts, the critical facility is not the stockpile of property rights in already existing knowledge or design, but rather the availability to the firm of extensive research facilities by which new knowledge is developed, and comes automatically into the hands of employees of that firm, and is thereby most readily avail-

able to engineers and others in the firm who can apply that knowledge to products and processes.

There has been various testimony that it is not the holding of a stock of patents but the availability of research facilities for the production of new knowledge that is critical in the industrial competition. Mr. Kettering, onetime vice president of General Motors, testified to the Temporary National Economic Committee to this effect.

Senator LONG. Mr. Kettering himself is regarded or was regarded at one time as a pretty good inventor.

Mr. MELMAN. That is correct. In fact, he so described himself on many occasions, proudly, and indeed, we have every reason to acknowledge Mr. Kettering's creative ingenuity.

Senator LONG. Isn't he the man who invented the original self-starter in the automobile, which could start the car without cranking it up?

Mr. MELMAN. To him, sir, is ascribed the first design of the self-starter. May I quote from the TNEC hearings,[23] page 16311:

> Mr. O'CONNELL. It occurred to me that even in the absence of any patent laws at all, the mere force of competition in the industry would probably require the type of organization you have been describing.
>
> Mr. KETTERING. I imagine so; yes. But I am a terribly optimistic person on what can be done if we get coordinated right.
>
> Mr. O'CONNELL. I do not want to press the point, Doctor, but apparently organizations such as yours would undoubtely continue to function and would be forced by competition to function even were there no patent laws.
>
> Mr. KETTERING. We don't run our organization for the purpose of taking out patents. We think only of the general problems.

I do not know of a more eloquent way of summarizing the informed judgment of a man who has himself participated in various types of design activity, and who was responsible for the management of large engineering facilities.

Senator LONG. Was he speaking as a General Motors executive at the time he testified before the TNEC?

Mr. MELMAN. Well, he was in that capacity at the time, certainly, sir.

Senator LONG. Will you help us at this time with the appropriate tables and quotations in your documents here which support the statement you have made? While we do not propose to print the pamphlet you are holding in your hand, we would like to take from that the particular charts, the statistical data, which you say, support some of your statements here.

I think that should be in the record in connection with these hearings. (See exhibit IX, p. 231.)

Mr. MELMAN. I would be delighted to counsel with Mr. Gordon and call to his attention these particulars and data.

Senator LONG. Let them be inserted in the record at this point. If you can spare it I would like to have a copy of that. Thank you so much for your presentation here, Mr. Melman.

Mr. ANSBERRY. I have a question. I understand, Dr. Melman, that one of the chief arguments for what you might call the patent bonus

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[23] Hearings before the Temporary National Economic Committee of the Congress of the United States. 76th Cong., 3d sess. (pt. 30). 1940.

under the Department of Defense policy is that the percentage profit accorded on a cost-plus-fixed-fee research and development contract is considerably less than most successful businesses except to make on a similar dollar volume of sales, which are not in the research field.

In other words, if they make an automobile they expect to make 20 percent and not 6 percent before taxes; and for this reason they should have the bonus of the later possible commercial development of the patents resulting from the research.

Do you have any comment on that argument?

Mr. MELMAN. Yes.

Mr. GORDON. This is a cost-plus-fixed-fee.

Mr. MELMAN. One of the major types of justification that is given for private profit as an incentive is that profit is a return to management for risk taking. The firms that you allude to, sir, who ask for this patent bonus, are precisely taking rather less risk than firms engaged in the production of products that are offered on the public market.

Senator LONG. I must say, Professor Melman, that when I hear some of these people talk about the great risks they take on a cost-plus-fixed-fee contract, it makes me feel that the only risk is that they might lose their contract. They might misplace it in the desk drawer.

Mr. MELMAN. There are other types of risks. There can be mistakes by accountants in the computing of costs.

Mr. GORDON. That can be rectified, can it not?

Mr. MELMAN. I would think so, sir. These are administrative risks of trivial order of magnitude.

But the essential point is clear. Firms operating on a Government contract, are paid for their costs, which include costs of managing, but are also offered a return on capital. They are being offered a guaranteed profit.

It would be a new theory of business enterprise that argues that profit is separable from risk taking. Perhaps we should ask some of the spokesmen for this point of view to elaborate on that. It might be very instructive.

On the other hand, since the theories and system of understanding of profit involve no clearly definable limit as to what is a sufficient profit, it is plausible that persons who work for a profit, so to speak should appear and request legislation that gives them opportunity to take a larger profit.

The problem before such a committee, sir, if I may venture to put it, is: What is the objective of the committee? Is it the objective of the committee to sponsor the profitability of large firms as a primary objective? It is the objective of the committee to sponsor the particular profitability of any sector of firms of any size or of any industry? Or is it the objective of this committee to seek out policies that are to the benefit of the United States as a whole?

Mr. ANSBERRY. And small businessmen too.

Senator LONG. Thank you very much, Professor Melman.

Mr. MELMAN. It has been a privilege to be able to serve you today. Thank you.

(Excerpts from the monograph prepared by Professor Melman follow:)

EXHIBIT IX

EXCERPTS FROM COMMITTEE PRINT ENTITLED "THE IMPACT OF THE PATENT SYSTEM ON RESEARCH", ISSUED BY THE SUBCOMMITTEE ON PATENTS, TRADEMARKS, AND COPYRIGHTS, SENATE COMMITTEE ON THE JUDICIARY (STUDY NO. 11), 85TH CONG., 2D SESS.

A study of the Subcommittee on Patents, Trademarks, and Copyrights of the Senate Committee on the Judiciary (Study No. 11), 85th Cong., 2d sess., prepared by Professor Melman)

Modern scientific and engineering research is increasingly characterized by the integrated application of the work of various specialists. The resulting conditions of interdependence in inquiry render the concept of the inventor obsolete to a considerable extent. The functions once embodied in the solo inventors who dominated the technical scene are now more often than not performed by various persons working in a cooperative group effort. To the extent that this is true, the traditional patent system, with its emphasis upon the protection and reward of the inventor, necessarily becomes less attuned to the purpose that it was set up to perform (p. 18).

* * * * * * *

Scientists and engineers are now largely employees paid to exercise their occupational skills. This pavment is on a time, not a unit of production, basis, and is substantially independent of patent taking. Much of the scientific work is done in nonprofit institutions, and here it is carried on with virtually no accompanying patenting activity (p. 21).

* * * * * * *

There are no established and accepted ways of evaluating the money worth of patents, either in terms of cost or in terms of market value. The cost aspect is of greatest interest here. The difficulty in evaluating the cost of producing a given patent stems from the character of research. Where the activities of many persons must be integrated as necessary conditions for the production of given knowledge there are no known methods for obtaining an objective measure of the total worth of the inputs required to produce a given result (p. 22).

* * * * * * *

It is noted that the factors influencing industrial research activity are the changing circumstances of interfirm competition, much more than the availability of patents. Likewise, the conduct of research in universities and other nonbusiness groups is largely independent of patent considerations, since in the nonbusiness laboratories knowledge is produced for its own sake and the search for knowledge irrespective of its commercial and industrial value, is a primary criterion in selecting research projects (p. 26).

a. patent activity and business-sponsored research

Among persons who are active in the patent field, there is substantial agreement that the opportunity to obtain patents has been a potent incentive for research outlays by industrial firms. If this assumption is valid, it supports the contention that patenting is an important factor in industrial research. But do the facts support the assertion? One way to find out is to examine the relation between patenting and research activities. The relation between research and patent activity can be approached in two ways, to wit, in aggregate terms and through the detailed records of particular firms.

For the period 1941–54 there are reliable estimates of the total number of research scientists and engineers in the United States. These data can be compared with the number of patents granted on inventions by the Patent Office. The data of table 1 show a dramatic growth in the number of scientists and engineers from 87,000 in 1941 to 194,000 in 1954, an increase of 120 percent. During the same period the number of patents issued shows a marked fall. Even if allowance is made for administrative problems of the Patent Office and other factors, the larger picture that emerges is plain enough. There has been no growth in the number of patents taken on inventions that matches

the increased number of scientists and engineers in the industrial and other research laboratories in the country.[1]

TABLE I.—*The number of patents granted for inventions in relation to the growth of research scientists and engineers*

	Research scientists and engineers [1]	Index of growth of research scientists and engineers	Patents granted for inventions [2]	Index of growth of patents granted for inventions
1941	87,000	100	41,184	100
1947	125,000	144	20,149	49
1954	194,000	220	33,872	82

[1] Department of Defense, Office of the Secretary of Defense (Research and Development), The Growth of Scientific Research and Development, at 12 (1953).

[2] Department of Commerce, Historical Statistics of the United States, 1789–1945, at 312 (1949); Statistical Abstract of the United States, 1954, at 520 (1954); id., 1955, at 505 (1955).

Even more striking is the lag that appears when one examines technological effort generally. Activity in patenting as compared with change in the total number of scientists and engineers, not just those engaged in research and development work, is shown by table 2. As this table shows, from 1900 to 1954 there occurred a massive expansion in the number of scientists and engineers from 42,000 to 691,000, an increase of 1,600 percent. In contrast, over this same period the largest increase shown in any given year in the number of patents granted was only 83 percent over the number granted in 1900 and in most years the increase was even smaller than this. The relationship between the growth of the number of scientists and engineers and the number of patents granted is reflected in the fifth column of table 2, by dividing the index of patent growth by the index showing the growth in scientists and engineers. The data show a steady and persistent decline from 1900 to date in patenting as compared to overall scientific and engineering employment. In other words, activity in taking out patents has lagged increasingly behind the total activity in science and engineering, as indicated in the growth of the total population of scientists and engineers, until today it is less than one tenth of what it would be had it kept pace [2] (pp. 27–28).

B. Emphasis upon patenting weakens the universities as scientific centers

Insofar as concern with patenting spreads through the universities, they become correspondingly less valuable as producers of new knowledge. This results from: (1) the tendency to select problems for research on the basis of whether they will lead to patentable inventions, not whether they will add to the store of knowledge as an end in itself; (2) the introduction of managerial decision making over investigators; (3) restrictions on publication; and finally, (4) adverse effects on the students themselves. These effects on the characteristics of university-located research are independent of the availability of larger budgets, better buildings, and more staff (p. 40).

* * * * * * * *

[1] One may properly ask whether it takes more manpower and costs more to make a given invention today than it used to? The data available here do not give a direct answer to this question. The several tables shown in this chapter do show, however, that the differences in rates of development between technical employment (and budgets) and patenting are large, both in the long run (1900–1954) and during shorter periods (1941–54, 1950–55, 1940–55, and 1942–54). It seems unlikely that changes in the state and circumstances of science and production technology during these shorter periods have been sufficiently great to explain the lag in patenting activity shown by these statistics. The writer is advised that there is no indication of any steady upgrading, over the decades, in the Patent Office standards of invention which would account for the reduction in patenting—at least to an extent beyond that which would balance the increased competency of technicians. Whitmore, "What's Got Into the Office Lately?" 29 J.P.O.S. 869 (1947); cf. hearings before the Senate Subcommittee on Patents, Trademarks, and Copyrights, 84th Cong., 1st sess., at 72–95 (Oct. 10–12, 1955).

[2] It may be suggested that the growth in Government-contracted research work during recent years may involve the employment of technical men on work that is not conducive to patenting by the contractor firm, since the patents would be Government-owned. This would not, however, explain the decline shown in table 2, which shows relative patenting activity since 1900. Nor does it explain the situation among the individual firms, as shown in tables 3 to 6 and in figure 1. Of the firms, only one is very active in Government-contracted research and development, and the data for this firm have been adjusted to exclude the Government-contract research staff.

Pressures for aggressive patenting start in universities in the interest of securing additional funds for research and teaching. However, the managerial characteristics of the directed research efforts that tend to flow from this policy and are undertaken toward this end, abridge the free pursuit of knowledge as an end in itself. In turn, these methods tend to have a weakening effect upon the functioning of universities as centers for scientific work. Thus, in the long run, pressures for patenting and similar efforts, if sustained, could exhaust the resources of the university that are essential for the training of new investigators and the pursuit of knowledge as an end in itself (p. 43).

* * * * * * *

Patent-oriented control of research, as one aspect of the use of knowledge as property, leads to effects that run contrary to the requirements of efficient promotion of science. Business criteria, like any other closely defined criteria for selection of research problems, restrict the scope of acceptable problems and the freedom of the investigator. Business requirements for keeping knowledge secret block the free publication that is a necessary part of the process of inquiry.

The effects noted here are especially important in the promotion of science because of the interdependence and need for integration of knowledge which was described in chapter III, above. Under such conditions, the people who decide on research projects, the criteria used, and policies on publication affect the degree to which scientist and engineers may participate in the necessarily integrated effort of the expansion of technical knowledge. Insofar as the pursuit of patent rights contributes to research and publication policies that contradict the requirements of interdependence and integration, it may be said that the direction of effects of a patent system contradicts the requirements for the progress of science and technology (p. 48).

There is nothing to indicate that the absence of the patent system would diminish the scope or character of scientific research in the universities. Indeed, insofar as patent pressures were removed from university scientists, this would probably strengthen the universities as producers of science and technology. Moreover, business expenditures for research, in the estimate of this writer, would not be appreciably diminished by the elimination of opportunities for claiming patent rights. It is true that in the absence of patenting, some of the characteristics of industrial research might be revised. Competitive pressures along product and production cost lines, that now impel the expansion of industrial research outlays would, however, continue to be operative (p. 56).

* * * * * * *

The evidence and analyses of this study indicate that there is a growing disharmony between the efficient production of new technical knowledge and the effort, through the patent system, to treat that knowledge under property relations. This disharmony is intensified as the division of labor in science increases and, as a consequence, the conduct of inquiry becomes increasingly social production that requires the integration of interdependent technical skills. These developments make it increasingly difficult to specify what is new, what is invention, and who is an inventor. The effects from these factors would not be essentially altered, in this writer's opinion, by variation in the rules for establishing property rights to knowledge.

The effort to operate a patent system formulated for the technological conditions of a century ago has proved to be increasingly awkward. The problems of patent-system operation, however, do not stem primarily from administrative shortcomings or from the absence of ingenuity among the able attorneys, judges, and Patent Office staffs who administer the system. Rather, they stem from the inability to apply the conceptions of a bygone era to the contemporary conditions under which technical knowledge is produced. At the same time, there can be little doubt that the patent system has been a useful instrument in industrial management's competitive process.

In this investigation, attention has been focused on the problem: Does the patent system now fulfill the constitutional purpose of promoting science and the useful arts, as indicated by the operation of industrial and nonprofit research laboratories? On balance, based upon the study of selected typical industrial and nonprofit research laboratories, the answer is "No."

The patent system in the contemporary scene has not, as a rule, promoted conditions that facilitate research in science or the industrial arts. On the contrary: In universities the effect of patenting pressures has been to inter-

pose managerial controls and commercial pressures where free, uninhibited inquiry is needed to promote the flow of science. In industrial laboratories research in the useful arts has been expanded rapidly, without a parallel growth in patenting activity. Moreover, the experience of a few firms, whose patent privileges have been recently abridged, indicates that these managements maintain and expand their industrial research in order to cope with problems of product and cost competition. The development of research in these and similar firms will bear close watching.

With or without a patent system, the efficient pursuit of knowledge in the universities and other nonprofit institutions will continue, within the limits of available resources, so long as the production of knowledge is treated as a sufficient end in itself. Industrial firms will continue to enlarge their research in the useful arts as dictated by competitive needs, with or without patent privileges. Henceforth, in the judgment of this writer, the main impetus for the promotion of science and the useful arts will come, not from the patent system, but from forces and factors that lie outside that system (pp. 61–62).

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Senator LONG. We will now proceed and hear Mr. Anderson.

STATEMENT OF ROLAND A. ANDERSON, ASSISTANT GENERAL COUNSEL FOR PATENTS, ATOMIC ENERGY COMMISSION; ACCOMPANIED BY PHILIP G. READ, SMALL BUSINESS SPECIALIST, AEC

Mr. ANDERSON. I believe the committee has the prepared statement. If you would like me to skip over and merely hit some of the highlights I would be pleased to do so at the committee's request.

Senator LONG. You may proceed as you wish. [23a]

Mr. ANDERSON. Mr. Chairman and members of the committee, it is a pleasure to present the present policies and practices of the United States Atomic Energy Commission.

THE COMMISSION CONTRACT POLICY

The Commission has pursued a policy in its funded research and development and operating contracts of employing patent provisions under which the Commission is in position to acquire all rights in inventions and discoveries in the atomic energy field. This policy was initially promulgated by the Commission's predecessor, the Mahattan Engineering District, and is in general, similar to the usual commercial and industrial practice where the private sponsoring company generally acquires all rights in inventions and discoveries that result from the privately sponsored and funded research and development work.

It is the Commission's view that where the Commission sponsors and pays for research and development in the field of atomic energy that the resultant inventions and discoveries should be the property of the Government for the benefit, not only of the particular contractor, but of the general public. This policy of the acquisition of all rights in inventions and discoveries in the atomic energy field together with a corollary technical data provision under which the Commission acquires rights in the data to use the same as it sees fit, has permitted the Commission and the Government generally, complete freedom of action as respects the dissemination of scientific and technological atomic energy information prepared and developed

[23a] Mr. Anderson read his complete statement.

under Commission contracts to the entire public, in the public interest and not just to contractors and other selected groups. The Commission's ownership of the rights in the discoveries and inventions in the atomic energy field has avoided the granting of special privileges and the establishment of preferred positions by contractors.

While the AEC has a substantial number of research and development prime and subcontracts, as noted in the list of research and development prime and subcontracts reported during the 5-year period 1954–58, as set forth in appendix A,[23b] yet much of the programmatic research and development is performed by relatively few contractors. To the end of 1958 approximately 90 percent of the inventions reported under Commission contracts have been reported by some 14 Commission contractors, so that, if AEC had a policy of acquiring only a governmental license, the possibility of establishing preferred positions does exist.

One of the present effects of the AEC patent and technical data policy is that all unclassified technological and scientific information prepared and developed by the Commission and its contractors is presently available to every company presently engaged in atomic energy work. Everyone is entitled to use the scientific and technical data and the inventions and discoveries that have resulted from Commission contracts. This utilization of technology would not be possible under a program that provided only for royalty-free use by the Government.

This policy, although adopted during the early days of the MED project, has been implemented by the statutory provisions of the Atomic Energy Act of 1954. The 1954 act has three sections dealing specifically with the rights of the Commission in inventions and discoveries resulting from or arising out of Commission contracts—namely sections 152, 159, and 161(g).

The specific patent article used by the Commission reserves to the Commission the right to determine the disposition of title to and rights in and to any inventions or discoveries made or conceived in the course of, in connection with, or under the terms of the contract. In instances where the contractor has an established industrial and patent position in the nonnuclear field and the research is conducted in other than a Commission laboratory or facility, the article employed provides for the contractor's retention of at least a nonexclusive license. If, in addition thereto the research and development work relates only incidentally to basic research of the Commission and results from more or less routine development work, the contract provision used provides for the retention of a sole license (except as against the Government) in the contractor for purposes other than for use in the production or utilization of special nuclear material or atomic energy.

Where the Commission supports research in a field where the contractor has already done some research, which is generally described as a "background position," the Commission also acquires a nonexclusive license for governmental purposes or some other limited purpose in such background contributions. The scope of the background provision is dependent upon the facts of the situation and the particular purposes of the research and development work.

[23b] See exhibit X(A), p. 238.

There is one other contract patent provision which the Commission employs that may be of general interest, namely the patent indemnity provision in favor of the Government. Where the Commission purchases standard or commercial items or where the contract is for services to be performed in a manner normally utilized by the contractor, the Commission incorporates in such contracts or purchase orders, a provision under which the contractor indemnifies the Government in respect of patent infringements that result from the furnishing of such a standard or commercial components or items, or result from the performance of such standard services.

This, in brief, is the Commission's contract patent picture.

THE COMMISSION'S AUTHORITY TO LICENSE PRIVATE PATENTS

The Atomic Energy Act of 1954 has a unique provision that may be of interest to this committee, namely section 153 that provides for compulsory licensing of privately owned patents in the atomic energy field under unusual circumstances. The section was recently extended by section 114 of the AEC Authorization Act, Public Law 50, 86th Congress, so that provision, as extended, is in force as to any patent, the application for which is filed on or before September 1, 1964. The Commission has had no occasion to invoke the authority to date. The Commission considers it a reserve power which, if the occasion arises where, in the public interest, the Commission deems that (1) the invention is of primary importance in the production or utilization of special nuclear material or atomic energy and (2) the licensing is of primary importance to effectuate the policies and purposes of the act, the same could be invoked.

The very existence of the authority may have a salutary effect and prevent abusive and unhealthy situations. The restrictive conditions and procedures surrounding the exercise of the authority are such that it could only be used in comparatively rare and compelling cases where the patent owner refused to license a Commission authorized private activity.

One of the situations that could arise for employing said section 153 involves the private atomic power industry. A private company operating a power reactor generating electricity for some local community could find itself subject to a patent infringement charge on a fuel element covered by a patent which was issued subsequent to the construction and startup of the reactor. In such an instance, if the owner refused to license the company, the authority of the Commission under subsection 153a could be involved or the company could initiate proceedings under subsection 153c. If the company initiated a proceeding and the Commission found that the company's activities met the tests of "primary importance" under subsection 153e, the Commission could grant a license and if the patent owner and the company could not agree on a reasonable royalty the Commission could, after hearing, fix the reasonable royalties. The only benefit of the normal patent system that the owner of such a patent is denied by section 153 is the injunctive relief. Where the activities are of "primary importance" to the furtherance of the Atomic Energy Act it can be seriously questioned whether the public inconvenience and interest is not such as to warrant denial of injunctive relief.

THE LICENSING OF COMMISSION OWNED PATENTS

The Commission is authorized to hold patents and to license and otherwise treat with patents by sections 156 and 161(g) of the Atomic Energy Act of 1954.

Section 156 provides for the establishment of standard specifications for the granting of licenses and the specifications have been promulgated and are set forth in 10 C.F.R. 81. The Commission has a portfolio of some 2,225 U.S. patents, several hundred foreign patents, and several thousand U.S. and foreign patent applications. In addition thereto several hundred domestic and foreign patent applications have been filed by contractors on inventions in which the Commission has rights. The domestic and foreign applications filed by the Commission and its contractors over the past 5 years are set forth in my exhibit (B). (See exhibit X(B), p. 238.)

The Commission has, to date, granted over 780 royalty-free licenses and in addition contractors have retained licenses in some 425 patents. The Commission's policy is to grant, upon request, royalty free, nonexclusive licenses on Commission-owned U.S. patents to all, and to grant the same type of nonexclusive license to U.S. industry on Commission foreign-owned patents.

The Commission's research and development contract articles include a provision that all technical data developed in the course of contract work become the property of the Commission, to be used by the Commission as it sees fit, so that the Commission may be in a position to fulfill its statutory responsibilities for dissemination of technical and scientific information under sections 3 and 141b of the Atomic Energy Act of 1954.

THE COMMISSION'S PUBLICATION POLICY

The Commission has a vigorous program for the dissemination and publication of such technological atomic energy information. In the past 3 years over 46,800 documents have been declassified and made available aside from the many thousand unclassified reports and documents released and disseminated either directly or through contractors.

It is hoped that the foregoing information as to the Atomic Energy Commission's patent policies will be found useful in the studies of your committee.

(The documents referred to follow:)

EXHIBIT X(A)

Research and development prime and subcontracts reported to the Office of the Assistant General Counsel for Patents between the years 1954 and 1958, inclusive, in which was incorporated a patent provision in accordance with the Commission's policy

Year	Prime contracts			Subcontracts		
	A	B	C	A	B	C
1954	159	8	6	371	18	29
1955	174	8	8	499	27	36
1956	234	14	24	501	38	73
1957	243	6	10	508	32	48
1958	242	3	15	393	8	32

NOTE.—Those indicated as type A are contracts in which the Commission has the right to acquire all of the rights. Type B are those in which the contractor, by contract, retains at least a nonexclusive license. Type C are those in which the contractor, by contract, retains the exclusive rights (except as against the Government or its account) for purposes other than use in the production or utilization of special nuclear material or atomic energy.

EXHIBIT X(B)

Domestic and foreign patent applications filed by the Commission or its contractors between Jan. 1, 1955, and Nov. 15, 1959

Year	Domestic filed by—			Foreign filed by—		
	AEC	Contractor	Total	AEC	Contractor	Total
1955	227	38	265	25	35	60
1956	238	15	253	86	35	121
1957	213	47	260	236	34	270
1958	217	32	249	327	43	370
1959	195	34	229	368	79	447
Grand total	1,090	166	1,256	1,042	226	1,268

NOTE.—In most of the applications filed by contractors the Commission has retained exclusive infield rights subject to a nonexclusive license in the contractor. In some of the applications filed by contractors the subject matter is deemed not of sufficient primary interest to the Commission's activities so that the Commission has only retained a nonexclusive license.

Senator LONG. Could you tell me how much classified material you are holding as compared to the amount of unclassified?

Mr. ANDERSON. I think today it is fair to say it is only that information which pertains to the military aspects of our program which is classified, and I would venture a guess that there is a very, very small percentage, somewhere less than probably 5 or 6 percent; and this is only a guess on my personal part, but I would say it was a very small part.

I think it is fair to say that all technological information in the field of atomic energy, except weapons information and production data is unclassified or declassifiable, as we call it.

Senator LONG. Do you believe the policy you are following in the Atomic Energy Commission is the best way to get ahead with this job by staying out in front of the Soviets and our competitors?

Mr. ANDERSON. I think in atomic energy we have a unique situation.

We had a development that occurred during an emergency period of the Government.

The Government paid for the entire basic program and has carried on largely the research and development program in this area.

I think, therefore, it may be said that up until the present time, at least, we feel our policy has been correct in that it has permitted everyone to use this information for which the public is the largest single contributor.

Senator LONG. What type of incentive awards do you give to your employees, or others who find patentable information?

Mr. ANDERSON. The Commission has established an incentive award system for valuable contributions as to which its employees may be granted an award, and one of the things taken into account is inventions that may have been made by that employee.

He can get his award without ever having made an invention. We do not give an award merely because of invention insofar as our employees are concerned.

With respect to our contractors, if the contractor has a policy——

Senator LONG. What type of award would it be?

Mr. ANDERSON. In the nature of value?

Senator LONG. Can you give me a typical instance of the type of award that you are talking about, and handing out?

Mr. ANDERSON. Yes, sir.

One of our employees made a contribution in the form of a new detecting system which was very valuable insofar as protecting our various installations are concerned.

This employee submitted to the Commission his invention.

We filed an application on it and the patent has recently issued.

We have accorded a number of commercial licenses on that patent. He, in addition to his regular salary, was given an award, I believe, of $500, and one of his coworkers was given a smaller award very recently by the Commission under the Commission's award system.

Senator LONG. $500?

Mr. ANDERSON. $500.

Now, the Commission has established under section 157 an award system under which the principal award is the Fermi Award, which is given as an annual award to an outstanding scientist or contributor to the atomic energy field.

This award consists of a medal, a citation, and a $50,000 check.

It might be of interest to this committee to know that the award was made only a week ago for the year 1959 to Dr. Glenn T. Seaborg the codiscoverer of plutonium, and a very active scientist in the early days on the Commission's program who, with his coworkers, developed the present separation methods that the Commission is employing in its large plants.

This award has been given to Dr. Fermi, who was the first recipient, Dr. von Neumann, who was the second, Dr. E. O. Lawrence was the third; and Dr. Wigner was the fourth recipient.

In addition, the Commission has recently established what is known as the E. O. Lawrence Award, which will consist of a medal and a citation, as well as a monetary award.

It can go, I believe, from $5,000 to $25,000, and is to be given to junior scientists for their valuable contribution in the program.

Senator LONG. Don't you have it within your power to give as much as $100,000?

Mr. ANDERSON. We have no limitation as respects the awards that may be given.

The Commission, pursuant to the general statutory authority, set $50,000 as the upper limit for this award, which is an award given for recognition and not as a matter of right.

We have an awards system in the Commission which is, one might say, similar to a court of Claims action, whereby a private inventor who makes a contribution in the atomic energy field and complies with certain requirements may come and make an application for an award before our Patent Compensation Board.

There is no limit as to the amount of the award that Board can make.

Senator LONG. How do you think your award system compares as far as incentive is concerned with most of the private concerns, large corporations?

Mr. ANDERSON. I think our internal system compares to private concerns and in that respect let me say when it comes to what the private concerns do for their employees, the fact that the invention is made under a Commission contract, does not exclude the employee from getting an award under the awards system that the contractor has, and we reimburse him for the amount of award that the contractor pays to the employee.

For example, if the company has a system of awards whereby upon the filing of a patent application the employee is entitled to $50, he gets that even though title goes to the Commission, and if the patent goes to issue and the company pays an additional $50 for the issuance of a patent to an employee, that money is paid to him and we reimburse the contractor under the contract.

Senator LONG. I notice in section 306 of the NASA Act, they have the power to go up to $100,000, and they can go beyond that, providing they get the approval of Congress on it.

I do not recall whether they have ever asked Congress for such approval. If it happened, I do not know about it.

In view of that $100,000 figure, it would seem to me you might very appropriately set your top award at $100,000.

Mr. ANDERSON. That could be.

Senator LONG. Right now it is $50,000?

Mr. ANDERSON. Right now at the present time it is $50,000.

Senator LONG. Do you find that this incentive and award program does play a considerable part in getting better work from your scientists and engineers?

Mr. ANDERSON. I think it is difficult to evaluate that. I think that certainly so far as we have been able to ascertain from our contractors, we find that the employees are very desirous of reporting inventions and getting a patent application filed in order to even get that little honorarium of $50, $100 or $150 or in some instances it might go up as high as $500 because it is just a little more in their pockets in addition to their salary.

I think we should recognize it is not only these monetary awards these gentlemen might receive by virtue of making an invention, they get credit in their company. They may move along faster in the company; they may be recognized as being of a creative mind, and thereby their salaries are increased.

Senator LONG. Some years ago I played some part in the passage of a bill that gave you the right to make merit awards on an annual basis to employees who just did a good job. That had nothing to do with patents, but just somebody who did a good job and found some ways to do things better.

Do you use that system as well?

Mr. ANDERSON. We do, and that is given for meritorious service on an annual basis to outstanding employees of the Commission.

Senator LONG. As I recall, that law has been modified and expanded since I first offered the amendment, but if I recall correctly, you can give both a cash award and you can give a fellow a pay raise which would be permanent, a permanent pay raise, or advancement in his grade.

Do you use all of those?

Mr. ANDERSON. I do not know about the advancement in grade by virture of meritorious contribution as the sole factor. I think we do use the system of giving a citation, a medal, and a cash award to employees who do make valuable contributions.

I think that, in general, the cash amount varies from something like $750 to $2,000, $3,000, up to $5,000 even.

Senator LONG. Yes.

It would seem to me that few awards—if you had a few awards sprinkled here and there among your Commission, it would undoubtedly help to bring better results.

Mr. ANDERSON. It certainly is good for the morale.

Senator LONG. Yes.

Mr. ANDERSON. If it is properly administered.

Senator LONG. Yes.

I have nothing further.

Mr. GORDON. I think we can run through these questions fairly rapidly.

The AEC then, in its patent policy, is following the usual business practice, is that right?

Mr. ANDERSON. By usual business practice, I assume you mean that the industrial concern that pays the research generally acquires the patents as a result of the employee's efforts?

Mr. GORDON. That is correct.

Mr. ANDERSON. To this extent we are following what may be said to be similar to an industrial practice as regards inventions in the field of atomic energy.

Mr. GORDON. The contractor could still use the invention in a commercial field, can't he?

Mr. ANDERSON. Yes, sir. As I said, we grant licenses nonexclusively to everyone, including the contractor.

Mr. GORDON. Do you believe that your policy makes it easier to acquire scientific knowledge and disseminate it to the community than thet other policies outlined, say, this morning?

Mr. ANDERSON. There are no limitations as respects what the Commission can disseminate except securitywise, and we acquire the technical data of the contractor that are developed and furnished under the contract. To this extent, the Commission, I suppose, is in position to see that that information is disseminated, whereas in some other departments, they may not have this publication authorization and,

in fact, under the Atomic Energy Act, I think we could refer to sections 3 and 141(b), we are directed to disseminate the scientific and technical information.

Mr. GORDON. I see.

Do you believe your policy avoids the granting of special privileges to a greater degree than the policies of other agencies in Government?

Mr. ANDERSON. I suppose to the extent that we acquire the rights, mechanical data, and patents involved in research, it may further the better interests of an overall program in atomic energy.

Mr. GORDON. Mr. Anderson, it has been stated that unless all rights are given away to the contractor, it would be extremely difficult to secure contractors willing to do research and development work for you. Did you find that to be your experience?

Mr. ANDERSON. In my own personal experience, I cannot say that we have had difficulty in getting contractors to do research and development work because of our patent policy.

There may have been, one or two instances where the contract negotiations fell through because of our patent policy.

I think it fair to say there may be other situations where industrial concerns do not come to us and request research and development work because of our policy.

Senator LONG. Is it not also true that if some of these concerns were not able to acquire patent rights from the Department of Defense, they might be at your doorstep trying to get your contracts?

Mr. ANDERSON. No. I think many of the same concerns they negotiate with, we have contracts with.

Senator LONG. Is that right?

Could you, if possible, supply us with a list of the few large corporations with whom you believe the Department of Defense is doing business, as well?

Mr. ANDERSON. I believe we might be able to furnish such a list.[24]

Senator LONG. I am interested in which of the 100 or 200 largest corporations perform research activities for you.

Mr. ANDERSON. With the Commission?

Senator LONG. Yes.

Mr. GORDON. As I understand it, Mr. Anderson, even with your present policy you have no difficulty getting your work done by competent people; is that correct?

Mr. ANDERSON. Thus far to date we have not.

Mr. GORDON. You have not had. I see.

Which policy, in your opinion—I'm really asking you to compare your policy with that of other agencies—is more conductive to the growth and development of this particular infant industry? It is an infant industry, is it not?

Mr. ANDERSON. You are speaking now of the atomic energy industry?

Mr. GORDON. That is right.

Mr. ANDERSON. My own personal views on that is that our present policy has facilitated to a certain extent getting people into an infant industry because they are in position to utilize the technology and the patents that have come out of it, so that I would suppose that my

[24] See exhibit XI(E), p. 249.

answer to your specific question is that I personally feel that our present policy has assisted in some respects in promoting certain areas of atomic energy.

I should also qualifiedly say that there may be justification for many policies in the Government. I am not of the opinion that the present policy of the Commission is the only policy that should be pursued by a Government agency. I think you have to take into consideration what its objectives and what its responsibilities are as respects the public and the Government, rather than saying one policy should be fixed for all agencies of Government.

Mr. GORDON. Have your contractors protested against your policy? What is their general feeling about it?

Mr. ANDERSON. I think we can say that the contractors have protested, and industrial associations and patent associations have expressed themselves rather uniformly and consistently against the policy pursued by the Commission in the atomic energy field.

Mr. GORDON. I hesitate to ask this, but would it be fair to say that whereas the effects of your policy are to make scientific data readily available to all in this field, the effects of the DOD policies are just the opposite, that is, to make data less available, and in many cases unavailable?

Mr. ANDERSON. I do not know if I am even qualified to speak as to what effects the DOD policies have.

I think certainly under certain of their programs they acquire pretty much the same kind of information and are privileged to disseminate that.

Mr. GORDON. We have had testimony yesterday that businessmen tried to secure data, technological and scientific knowledge, which had been developed at Government expense, and found it to be unavailable. These businessmen could not get it, even 3 years after the development of a particular item.

This is one of the consequences of that type of policy.

Would it be fair to say that the effects of your policy are to make scientific data easily available to all in your particular field—and this is in direct contrast to the effects of the other policies?

Mr. ANDERSON. Certainly the effects of our policy is to make it available to everyone. Whether that is the wisest policy or the preferred policy to advance a particular thing at a particular time may be questioned.

I think that certainly if you have got a responsibility, as we have, where you have got a basic development that has taken place, at the expense of the Government, that we owe on obligation to the public to make that kind of information available.

On the other hand, you could also find if you are making a development contract merely for an improvement of an existing commercial device, that it may be unjustified to ask that the technical data be given for anything more than for your own governmental uses, that is, under those kinds of limited circumstances.

Mr. GORDON. If the available new scientific knowledge is essential for scientific growth, would you include then that, perhaps, the other policies that we have just been discussing might tend to retard our rate of growth?

Mr. ANDERSON. There may be situations where this would be the case, and there may be other situations where the fact that you publish

means nobody takes and uses that knowledge, and therefore, to the extent that it falls by the wayside and no development takes place, that is not good.

Mr. GORDON. Can you give any specific examples of this?

Mr. ANDERSON. Of the latter?

Mr. GORDON. Yes.

Mr. ANDERSON. No, I cannot.

Mr. GORDON. On the other hand, I can give you some specific examples where information had been put into the public domain, where title had been taken by the U.S. Government, and where businessmen tried to get licenses.

I do hear of this possibility that you mention, but nobody seems to give any specific examples. All of the specific examples are on the other side.

Senator LONG. Is there any reason why there should be so few examples of the possibility you suggest?

Mr. ANDERSON. I do not know. I think we have looked up and sought to see whether or not our type of information made available to industry, had been used by industry. I think we, in the Commission, believe that the Commission patents have made a significant contribution to American industry, and that they have provided a foundation and contributed to the unhindered and rapid development in certain areas.

I can give an example of that in the fact that one of the outstanding developments stemming from our program was the establishment on an industrial scale of hydrometallurgical methods for the processing of various types of ores to separate and recover the metal values, such as uranium, vanadium, and the separated rare earths.

Many of the uranium ore-processing plants today that are producing material for us, employ what is known as the anion exchange resin process that was developed by Commission contractors.

Also one of the methods developed by the Commission is the solvent extraction method for the recovery of uranium values, and in this area the companies that are producing the particular uranium concentrate for us are—a lot of them are—employing this particular development. It was made and developed under particular AEC research contracts.

Senator LONG. Do you know whether the British are permitting the same type of development? Are they permitting private patents on atomic developments?

Mr. ANDERSON. The British?

Senator LONG. Yes.

Mr. ANDERSON. Yes. The British, I believe, employ a system in atomic energy somewhat similar to the Commission.

They allow the contractor a royalty-free license, and they retain the other rights, the balance of the rights, and accord licenses usually bearing royalties, on the patents that the United Kingdom Atomic Energy Authority acquires by virtue of its contracts.

Senator LONG. If a person is working on an atomic energy contract in England, and he discovers something he has a competitive advantage over those who get licenses by virtue of the fact that they must pay to the British Government a royalty for the use of the patents which he discovered?

Mr. ANDERSON. That is correct. The contractor gets the advantage of not having to pay a royalty. Everybody else—the Government

may, I think their policy is a flexible one enough to say they may grant free licenses, but I believe, generally, they grant them for reasonable royalties.

Senator LONG. So they give him some advantage?

Mr. ANDERSON. They give the contractor, at least the initial advantage, of getting royalty-free license on inventions that are made under his particular contract

Senator LONG. Yes.

Mr. GORDON. What advantages does a contractor get in doing R. & D. for the AEC?

Mr. ANDERSON. I suppose know-how, technical knowledge, and acquaintance with the type of work, the hope that he will develop things that will be useful in the field of peaceful uses of atomic energy later which will have commercial application.

At the same time, he acquaints himself and his organization with the overall activities in atomic energy.

Senator LONG. You have not mentioned profit. Does he make money out of it?

Mr. ANDERSON. I think our contractors get a profit, and I think in many respects those contractors are plowing their profits back into research and development in their own private atomic energy work and acquiring patents on their own atomic energy work.

Senator LONG. Is it your impression, then, that most of your contractors feel that this is going to be a great field for the future, and what they are making out of research and development contracts under AEC, they are trying to get even further ahead in their fields, looking toward the future?

Mr. ANDERSON. I think it fair to say that most of our contractors are engaging in private work looking toward the future.

Senator LONG. You mentioned the granting of licenses to people to use discoveries in the field of atomic power or other uses of atomic energy.

Do you charge them a fee for those licenses?

Mr. ANDERSON. No, sir. They are accorded free upon request.

Senator LONG. Would know-how then be about the only advantage that a person who developed an atomic discovery have over the fellow who applied for the license?

Mr. ANDERSON. I think this is fair. The fact that he had the contract and has a certain amount of advantage by virtue of know-how that has been developed.

Senator LONG. Are the contractors also required to make available to you such know-how as they have?

Mr. ANDERSON. Yes, sir.

Senator LONG. In other words, they are required under the contract to make available all patentable knowledge, and other processes?

Mr. ANDERSON. We have a provision which reads that all technical data, information, developed in the course of the contract is made available to the Commission for use of the Commission and to be used by the Commission as the Commission sees fit.

Senator LONG. Have you had many complaints from small business or other concerns, or various competitors, who want to compete with those who are presently contracting with you that corporations have not made available know-how or technical information in time for them to bid on work you are putting out?

Mr. ANDERSON. No, sir; I have no personal knowledge of any complaint of that character.

Senator LONG. In other words, so far as you know, when you have a contract to let, those who bid on it and negotiate for it feel they have had adequate information made available to them in order to make their proposals to you?

Mr. ANDERSON. I hope we find this to be the case. You may find that, despite all the information you furnish to someone who is coming in, it takes a certain amount of education and a period of education before he may perform as well as someone who has been in the area or field for a number of years.

Senator LONG. We had testimony yesterday that a person who was manufacturing cameras, who had been in the camera business a long time, wanted to bid on a contract for cameras. He could not get the information he would need to have, and could not even see a model of the camera on which he was invited to bid.

You have not had any complaints of that sort?

Mr. ANDERSON. No, sir; not to my knowledge.

Mr. ANSBERRY. Mr. Anderson, what is the annual dollar volume of your research and development contracts?

Mr. ANDERSON. I believe our entire research and development program for the last year, 1958, ran into something of $640,000,000 for all types of research and development conducted by the Commission.

Mr. READ. These are accrued costs during the year as opposed to contract obligations?

Mr. ANDERSON. This is Mr. Philip A. Read, who is the specialist on small business for the Commission.

Mr. GORDON. Mr. Anderson, will you supply for the record R. & D. sample contracts which show that the technical information developed under AEC sponsorship becomes Government property?

Mr. ANDERSON. Yes, sir. In that letter you would just like a sample of our patent clauses? [25]

Mr. GORDON. Yes, sir.

Senator LONG. Thank you so very much, Mr. Anderson.

Mr. ANDERSON. Thank you, sir.

(Data subsequently furnished by Mr. Anderson follows:)

EXHIBIT XI

U.S. ATOMIC ENERGY COMMISSION
Washington, D.C., December 17, 1959.

HON. RUSSELL B. LONG,
Chairman, Subcommittee on Monopoly,
Select Comittee on Small Business,
U.S. Senate.

DEAR SENATOR LONG: Pursuant to your request at the hearings last Wednesday, December 9, 1959, there is submitted herewith the types of patent articles employed by the Commission in research and development contracts. The type A article is the usual contract provision employed in Commission basic and programmatic research and development contracts. The other provisions, type B and C, are, as stated at the hearings and noted, employed where contractors have an established industrial and patent position in the non-nuclear field.

There is also submitted as attachment D, pursuant to your request, a copy of the usual technical data article employed in research and development contracts.

[25] See exhibits XI (A), (B), (C), (D), and (E), pp. 247–251.

You requested a list of a number of Commission research and development contractors who, it is believed, also have research and development contracts with the Department of Defense. Attachment E is the list and it should be noted that the Commission and Department of Defense contracts for research and development may be with different divisions of the same parent corporation.

Very truly yours,

ROLAND A. ANDERSON,
Assistant General Counsel for Patents.

EXHIBIT XI(A)

TYPE A PATENT PROVISIONS

The following patent article shall be used when the work to be performed or the material or equipment to be furnished by the contractor is of such character that any inventions or discoveries that may be made probably will relate directly to or concern some phase of the research or development work which AEC conducts or sponsors.

1. Whenever any invention or discovery is made or conceived by the contractor or its employees in the course of, in connection with, or under the terms of this contract, the contractor shall furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed, and to determine the disposition of the title to and rights under any application or patent that may result. The judgment of the Commission on these matters shall be accepted as final; and the contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.

2. No claim for precuniary award or compensation under the provisions of the Atomic Energy Acts of 1946 and 1954 shall be asserted by the contractor or its employees with respect to any invention or discovery made or conceived in the course of, in connection with, or under the terms of this contract.

3. Except as otherwise authorized in writing by the Commission, the contractor will obtain patent agreements to effectuate the purposes of paragraphs 1 and 2 of this article from all persons who perform any part of the work under this contract, except such clerical and manual labor personnel as will not have access to technical data.

4. Except as otherwise authorized in writing by the Commission, the contractor will insert in all subcontracts provisions making this article applicable to the subcontractor and its employees.

EXHIBIT XI(B)

TYPE B PATENT PROVISIONS

The following patent article shall be used when the work to be performed or material or equipment to be furnished by the contractor is of such character that any inventions or discoveries that may be made probably (*a*) will relate only incidentally (and not directly) to some phase of the basic research or development work which AEC conducts or sponsors, but (*b*) will relate to a field of work in which the contractor has an established industrial and patent position.

1. Whenever any invention or discovery is made or conceived by the contractor or its employees in the course of, in connection with, or under the terms of this contract, the contractor shall furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed, and to determine the disposition of the title to and the rights under any application or patent that may result; provided, however, that the contractor, in any event, shall retain at least a nonexclusive, irrevocable, royalty-free license under said invention, discovery, application, or patent, such license being limited to the manufacture, use, and sale for purposes other than use in the production or utilization of special nuclear material or atomic energy. Subject to the license retained by the contractor, as provided in this paragraph, the judg-

ment of the Commission on these matters shall be accepted as final; and the contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.

2. No claim for pecuniary award or compensation under the provisions of the Atomic Energy Acts of 1946 and 1954 shall be asserted by the contractor or its employees with respect to any invention or discovery made or conceived in the course of, in connection with, or under the terms of this contract.

3. Except as otherwise authorized in writing by the Commission, the contractor will obtain patent agreements to effectuate the purposes of paragraphs 1 and 2 of this article from all persons who perform any part of the work under this contract, except such clerical and manual labor personnel as will not have access to technical data.

4. Except as otherwise authorized in writing by the Commission, the contractor will insert in all subcontracts provisions making this article applicable to the subcontractor and its employees.

EXHIBIT XI(C)

TYPE C PATENT PROVISIONS

The following patent article shall be used when the work to be performed or the material or equipment to be furnished by the contractor is of such character that any inventions or discoveries that may be made will probably: (*a*) relate only incidentally (and not directly) to some phase of the basic research or development work which AEC conducts or sponsors, (*b*) relate to a field or work in which the contractor has an established industrial and patent position, and (*c*) result from routine development or production work by the contractor.

1. Whenever any invention or discovery is made or conceived by the contractor or its employees in the course of, in connection with, or under the terms of this contract, the contractor shall furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed, and to determine the disposition of the title to and the rights under any application or patent that may result; provided, however, that the contractor in any event, shall retain at least a sole (except as against the Government or its account), irrevocable, royalty-free license with the sole right to grant sublicenses, under said invention, discovery, application or patent, such license being limited to the manufacture, use, and sale for purposes other than use in the production or utilization of special nuclear material or atomic energy. Subject to the license retained by the contractor, as provided in this paragraph, the judgment of the Commission on these matters shall be accepted as final; and the contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.

2. No claim for pecuniary award or compensation under the provisions of the Atomic Energy Acts of 1946 and 1954 shall be asserted by the contractor or its employees with respect to any invention or discovery made or conceived in the course of, in connection with, or under the terms of this contract.

3. Except as otherwise authorized in writing by the Commission the contractor will obtain patent agreements to effectuate the purposes of paragraphs 1 and 2 of this article from all persons who perform any part of the work under this contract, except such clerical and manual labor personnel as will not have access to technical data.

4. Except as otherwise authorized in writing by the Commission, the contractor will insert in all subcontracts provisions making this article applicable to the subcontractor and its employees.

EXHIBIT XI(D)

AEC DRAWINGS, DESIGNS AND TECHNICAL DATA ARTICLE

Drawings, designs, specifications. All drawings, sketches, designs, design data, specifications, notebooks, technical and scientific data and all photographs, negatives, reports, findings, recommendations, data and memorandums of every

description relating thereto, as well as all copies of the foregoing relating to the work or any part thereof, shall be subject to inspection by the Commission at all reasonable times (for which inspection the proper facilities shall be afforded the Commission by the contractor and its subcontractors), shall be the property of the Government and may be used by the Government for any purpose whatsoever without any claim on the part of the contractor and its subcontractors and vendors for additional compensation and shall, subject to the right of the contractor to retain a copy of said material for its own use in conformance with and subject to the security and patent provisions of the contract, be delivered to the Government, or otherwise disposed of by the contractor either as the contracting officer may from time to time direct during the progress of the work or in any event as the contracting officer shall direct upon completion or termination of this contract.

EXHIBIT XI(E)

AEC has, or has had, research and development prime or subcontracts with the following companies who may have, or may have had, prime or subcontracts with the Department of Defense:

ACF Industries, Inc.
Aerojet-General Corp.
Aeroprojects Inc.
Air Products, Inc.
Air Reduction Co.
Airborne Instruments Laboratory, Inc.
Alco Products, Inc.
Allied Chemical & Dye Corp.
Allis-Chalmers Manufacturing Co.
Allstates Engineering Co.
American Machine & Foundry Co.
American Radiator & Standard Corp.
Arma Corp.
Armour Research Foundation of Illinois Institute of Technology
Atlantic Research Corp.
Atlas Engineering Corp.

Babcock & Wilcox Co.
Battelle Memorial Institute
Bechtel Corp.
Bendix Aviation Corp.:
  Friez Instrument Division
  Research Division
  Bendix Products Division
  Eclipse Pioneer Division
Boston University
Brush Beryllium Co.
University of Buffalo

California Institute of Technology
University of California
Carborundum Co.
Carnegie Institute of Technology
University of Chicago
Clevite Corp.
Collins Radio
Columbia University
Combustion Engineering, Inc.
Cook Electric Co.
Cornell Aeronautical Laboratory, Inc.
Cornell University
Corning Glass Works
Curtiss-Wright Corp.

Douglas Aircraft Co.
Dow Chemical Co.
Allen B. DuMont Laboratories, Inc.

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Duke University
E. I. DuPont de Nemours & Co. (AEC, Savannah River Operations)

Edgerton, Germeshausen & Grier, Inc.
Esso Research & Engineering Co.

Fairchild Engine & Airplane Co., Inc.
Fluor Corp.
Florida State University
Foster Wheeler Corp.
Franklin Institute of the State of Pennsylvania

Garrett Corp.
General Dynamics Corp.
    General Atomic Division
    Convair Division
    Electric Boat Division
General Electric Co. (including Knolls Atomic Power Laboratory, Schenectady, and Hanford Atomic Products Division)
General Mills, Inc.
B. F. Goodrich Co.
Goodyear Tire & Rubber Co.
The Griscom-Russell Co.

Harvard University

Illinois Institute of Technology
University of Illinois
Internuclear Co.
Isotopes, Inc.

Johns Hopkins University

M. W. Kellogg Co.
Peter Kiewit Sons, Inc.

Librascope, Inc.
Arthur D. Little, Inc.
Litton Industries
Lockheed Aircraft Corp.
Lummus Co.

The Martin Co.
Massachusetts Institute of Technology
Massachusetts General Hospital
Melpar, Inc.
University of Michigan
Minneapolis-Honeywell Regulator Co.
University of Minnesota
Monsanto Chemical Co.
Motorola Communications & Electronics, Inc.

National Aluminate Corp.
National Research Corp.
Newport News Shipbuilding & Dry Dock Co.
New York University
North American Aviation, Inc. (including Atomics International)
Nuclear Development Corp. of America
Nuclear Metals, Inc.

Ohio State University Research Foundation
Olin Mathieson Chemical Corp.
Owens Corning Fiberglas Corp.

The Ralph M. Parsons Co.
Phillips Petroleum Co.
University of Pennsylvania
Pennsylvania State University
University of Pittsburgh

Princeton University
Purdue University Research Foundation

Radio Corp. of America
Ramo-Wooldridge Corp.
Rand Corp.
Raytheon Manufacturing Co.
Rensselaer Polytechnic Institute
Rochester University
Rohm & Haas Co.

Sperry Rand Corp., Ford Instrument Division
Leland Stanford University
Stanford Research Institute
Sylvania Electric Products, Inc.
Sylvania-Corning Nuclear Corp.
Syracuse University

Technical Operations, Inc.
Thompson Products, Inc.
Thompson-Ramo-Wooldridge, Inc.
Tracerlab, Inc.

Union Carbide Corp.:
National Carbon Co.
U.S. Vanadium
Union Carbide Nuclear Co. [Oak Ridge Operations]
Linde Air Products
United Aircraft Corp.

Vitro Corp. of America

Washington University
Western Electric Co., Inc. (Sandia Corp.)
Westinghouse Electric Corp.
University of Wisconsin

Yale University

Senator LONG. Our next witness will be Mr. John A. Johnson, General Counsel, National Aeronautics and Space Administration.

STATEMENT OF JOHN A. JOHNSON, GENERAL COUNSEL, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; ACCOMPANIED BY GERALD O'BRIEN, ASSISTANT GENERAL COUNSEL ON PATENT MATTERS

Mr. JOHNSON. Thank you, Mr. Chairman.

Senator LONG. Will you summarize the statement which you have prepared for us, Mr. Johnson, and we will see that the full statement is inserted in the record, following your testimony.

Mr. JOHNSON. Mr. Chairman, I have Mr. Gerald O'Brien, our assistant general counsel on patent matters, with me this afternoon.

We have submitted a statement to the subcommittee in response to its request, which outlined the policies that we have adopted in the National Aeronautics and Space Administration during the past year since our establishment of NASA's patent program. It includes some comments on the anticipated effects of those policies on the economic progress of the Nation.

We also have included some recommendations concerning a change in the laws that now govern the patent operations of NASA.[25a]

[25a] See prepared statement, beginning p. 273.

There is a great deal of meat, I think, in our statement. I do not believe any agency has been quite as active as we have had to be during the past year, nor have they had occasion to be as active, in the formulation of patent policies governing the relations between the Government and its contractors.

So I think I should take a bit of time to review these in some detail.

The starting point is section 305(a) of the National Aeronautics and Space Act of 1958, which requires that NASA take title to contractors' inventions made under the conditions specified in that subsection unless the Administrator of NASA waives the Government's rights in the public interest.

Senator LONG. Can you tell me whether that was the result of an Administration recommendation?

Mr. JOHNSON. Mr. Chairman, this was not the result of the Administration's recommendation.

The precise form of this legislation was development in conference, I believe, after consideration of this legislation by both the Senate and the House (H. Rept. No. 2166, 85th Cong., 2d sess.).

It was reported out of conference and included in the final bill as enacted July 29, 1958.[26]

Senator LONG. Can you tell me whether it was the House or Senate? Just how did this provision get into the law? I would be curious to know how it got there.

Mr. JOHNSON. A provision reflecting at least this general philosophy on patents was included, to the best of my recollection, by the House in its bill.

When it went to the Senate, the Senate knocked the patent provisions out of the bill entirely, stating that this was a matter of such importance that they wished to reserve this for conference.

There were, of course, a number of other very controversial and strongly disputed provisions in the bill at that time. This was not the only one resolved in conference. In conference the final version went back in.

Senator LONG. I see.

What Senate committee handled that?

Mr. JOHNSON. Those were special committees set up for the precise purpose of considering the Nation's space program during that session of Congress.[27]

Senator LONG. That was the Johnson committee in the Senate that knocked it out?

Mr. JOHNSON. Yes, sir.

Senator LONG. And agreed to this in conference?

Mr. JOHNSON. Yes, sir. Senator Johnson was chairman of the Senate committee, and Mr. McCormack was chairman of the House committee. Those two committees have now been superseded by two permanent committees of the two Houses.

Senator LONG. Yes.

Mr. JOHNSON. Our statement then goes on to explain the contract provisions we have adopted to implement subsection 305(a) and 305(b) of our act.

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[26] H.R. 12575 became Public Law 85–568, July 29, 1958, 85th Cong., 2d sess., entitled "National Aeronautics and Space Act of 1958." (See exhibit XII(B), p. 271.)

[27] Special Committee on Space and Astronautics.

These are very elaborate clauses. We have entitled them "Property Rights in Inventions" clauses; and our statement describes in detail what those clauses seek to accomplish by way of facilitating the administration of these provisions of the law.

They require that the contractor report to the Administration, inventions that are made in the course of the performance of the contract.

The long clause—we have a shorter clause, too, if the contractor desires it—the long clause contains a presumption that the inventions reported have been made under the particular conditions specified in subsection 305(a).

These are the conditions which enable the Administrator to make a determination that the invention should belong to the Government.

Now, the contractor is given the option of rebutting that presumption by submitting statements concerning the precise conditions under which the invention has been made.

We adopted this provision because the policing problem otherwise would be extremely difficult, and we felt it was only reasonable to put that kind of burden upon the contractor.

If he does not come forward with the necessary facts for us to make an independent determination, then the agreed presumption takes effect that the invention has been made under the conditions specified in the act which enable the Government to take title. That, I think, is the main feature of the property rights inventions clause as outlined in our statement.

Senator LONG. Let me see if I understand this. You say you have a clause in your contract that any invention that this man seeks to patent is presumed to have been made under this contract or am I wrong about that? I am not sure I understood you correctly.

Mr. JOHNSON. No, sir. I think that to make this clear I really have to do the thing that I was trying to avoid doing for the purpose of saving time.

Subsection 305(a) of our act, and we have quoted this in our prepared statement, provides that: Whenever any invention is made in the performance of any work under any contract of the Administration, and the Administrator of NASA makes certain determinations which are spelled out in this subsection concerning the conditions under which the invention was made, then that invention shall be the exclusive property of the United States unless the Administrator determines in the public interest that the rights of the United States to that invention should be waived.

Now, all this contract provision does is to provide that with respect to inventions that are reportable to the Administration as having been made under the contract, those inventions will be presumed to have been made under the conditions specified in section 305(a) unless the contractor takes certain steps specified in the contract to prevent that presumption from becoming effective.

Senator LONG. Yes.

Mr. JOHNSON. This makes it simple for both the contractor and NASA to avoid an independent investigation of the conditions under which the invention was actually made in order to make these rather complicated statutory determinations.

But, as I have said, this is not a binding presumption on the contractor. He is completely free to rebut it upon his own initiative if he wishes.

I think I should say also, concerning this clause, that we made a decision that it does not have to be included in every single contract that NASA awards.

For instance, contracts for standard commercial off-the-shelf items, contracts that do not entail research and development work, do not include this clause because it is our conclusion this is not the kind of contract that Congress had in mind in enacting section 305.

The kinds of contracts in which this clause is required to be inserted are described in detail in our statement.[28] Basically they are contracts that have the prospect of entailing research and development work.

Now, in addition to the development of this clause, which is a very long and complex clause—I suppose one of the longest and most complex that has ever been developed for use in a Government contract—the Administration during the past year has also developed regulations governing the Administrator's exercise of his authority to waive rights in inventions produced under NASA contracts.

In other words, assuming now that an invention has been produced under the conditions enumerated in section 305(a), whether this determination is made by virtue of the presumption in the contract or by virtue of an independent investigation, the Administrator has the authority to waive the rights of the United States to that invention under subsection 305(f).

Mr. GORDON. Mr. Johnson, this second section you just mentioned does give the Administrator flexibility to take care of a situation where a product, an item, was developed under a contract under conditions other than a Government contract.

Suppose he had the idea before a contract, or he had done some work along certain lines before. That is taken into account, is it not?

Mr. JOHNSON. Yes, it is, and I was going to refer to the particular provisions of our waiver regulations that take that kind of thing into account.

Of course, if it were really developed prior to the NASA contract, then the NASA patent clause would not apply to it at all. But I think I can answer that question more precisely.

Senator LONG. Go right ahead.

Mr. JOHNSON. The section that I had reference to, subsection 305(f), does provide that any waiver of the Government's rights that may be granted to any such invention must be subject to the reservation by the Admintstrator of an irrevocable nonexclusive, nontransferable royalty-free license for the practice of such invention throughout the world by or on behalf of the United States or any foreign government pursuant to any treaty or agreement with the United States.

So, in any event, the Government always retains that kind of a license, even though title to the invention may be waived pursuant to the authority granted to the Administrator.

Now, our waiver regulations attempt to ——

[28] See p. 273 for prepared statement.

Senator LONG. Is that word "nontransferable" a word that means that the United States Government would not license a foreign government to produce a particular thing?

Mr. JOHNSON. No, sir; because it specifically provides for the practice of such invention throughout the world by or on behalf of the United States or any foreign government pursuant to any treaty or agreement with the United States.

So the question that you have asked me, Mr. Chairman, is dependent upon the terms of the agreement with the foreign nation in question.

Senator LONG. The license can then be transferred to the foreign government?

Mr. JOHNSON. Well, the license, in effect, runs to the foreign government under the provisions of our treaties or agreements.

Senator LONG. Yes.

Mr. JOHNSON. Our waiver regulations establish criteria by which inventions made under NASA contracts are grouped into two classes: first, those inventions which are not generally eligible for waiver, and, secondly, those inventions with respect to which a prima facie case for waiver may be established.

This regulation does not state in itself that a waiver will never be granted with respect to any particular kind of invention or that a waiver will definitely be granted with respect to a particular type of invention, but it purports to set up certain guidelines for the information of contractors.

Now, the first class are those which are not generally eligible for waiver. They have been described this way: Any invention which is either primarily adapted for, and especially useful in the development and operation of vehicles, manned or unmanned, capable of sustained flight without support from or dependence upon the atmosphere, or (2) inventions of basic importance in continued research toward the solution of problems of flight without support from or dependence upon the atmosphere.

What we have attempted to do here is to describe in general terms those inventions which pertain essentially to advancing the technology of space flight, because it was our judgment that this was probably the chief motivation of Congress in enacting this section of the law.

I say probably because the legislative history of this section is extremely thin, and does not provide us with guidance.

Now, concerning the second class, those with respect to which NASA considers that prima facie case of waiver is made out, there are four such categories.

First of all, where the invention was conceived prior to and independently of, but was first actually reduced to practice in the performance of work under a contract of the Administration, and the invention is covered by a U.S. patent issued or application filed prior to the award of the contract. We felt this was desirable because the definition of the word "made" in our statute includes the conception or first actual reduction to practice of an invention. We felt that in the case that I have just outlined, the equities were so strongly in favor of the contractor that we could safely say that a prima facie case of waiver was established merely by the ascertainment of those facts.

The second category is where it is shown that the invention was conceived or first actually reduced to practice in the performance of a contract of the Administration for research work with a nonprofit organization whose primary purpose is the conduct of scientific research, and the contract does not call for the delivery of models or equipment or the development of practical processes.

A typical situation here is a grant or a research contract with a university that is not engaged in a commercial line of business.

The third category is where it appears that the invention has only incidental utility in the conduct of activities with which the Administration is particularly concerned and has substantial promise of commercial utility.

Senator LONG. Can you give me any example of that category?

Mr. JOHNSON. I cannot give you an example of one that we have yet determined, because our experience is so new.

We have only had to consider a very few inventions so far because our whole research and development effort through contracts is less than a year old, and it takes time to report these.

Senator LONG. How many waivers have you issued so far?

Mr. JOHNSON. We have issued waivers in a number of inventions which were made under an Air Force contract which was transferred to us at the beginning of this fiscal year. The reason for that was that they were initially made under the Air Force contract which contained an essentially different patent provision than we have.

Mr. O'Brien, I think, can give us the exact number.

Mr. O'BRIEN. There were 38 in number.

Senator LONG. 38 waivers?

Mr. O'BRIEN. Yes.

Mr. JOHNSON. This is not a typical case, of course, and one that is not likely to be repeated, at least very many times, in the future.

Aside from that, we have only had reported to us so far about 8 or 10 inventions. We have presently pending, I believe, one application for waiver, and we have taken title to about seven at the present time, so we have not yet had an occasion to apply these criteria that I am outlining to specific cases.

Mr. GORDON. Mr. Johnson, this third category bothers me. If something is developed with Government money, and even though NASA cannot use it, if it has commercial application, as I understand it, you are giving away a valuable right to a private company; is that correct?

Mr. JOHNSON. No, Mr. Gordon; I would not describe it that way.

Mr. GORDON. When a waiver is granted on an invention which has only incidental utility in the conduct of activities with which the Administration is particularly concerned but has substantial promise of commercial utility—what precisely does that mean?

Mr. JOHNSON. The reason I took issue with your statement, is the emphasis you placed on giving away rights.

I think that in this category the typical situation is, very closely tied in with the next one, the fourth category. We could very well have a contractor here that had been engaged in a certain line of research and development for many, many years.

He has come almost to the point, let us say, of developing something of commercial utility. It just happens that, perhaps, he has

a small subcontract on a NASA project, but in the course of performing that particular work this development is brought to the point where a patent application can be made.

I think it is an oversimplification to say in that case, merely because of the expenditure of Government funds at the culmination of a long period of independent private development, that the Government is simply giving something away.

Senator LONG. Let us just look at it this way: Let us take a case that does not present so many equities as you mentioned.

Let us take a simple case where the man came to you without having anything that was particularly exclusive, without having anything a lot of other companies had to offer, and just said he wanted a contract to develop something, and he then developed something that could have very great commercial usage.

Although it might not have any military use that you could ascertain at the present time—would it be your feeling that you had no consumer interest in that item to protect in a case like that?

Mr. JOHNSON. Mr. Chairman, if it only had incidental utility and does not fall within the previous categories I mentioned—that is, of basic importance in research toward the solution of a space flight problem—and the other considerations I mentioned—we would say that those facts would create a prima facie case in favor of waiver of rights to that invention by the Government.

That is the policy we have adopted. In this whole field, I think the chairman will realize we have had to do a considerable amount of ground-breaking during the past year.

I would like to go ahead and show that in all of these cases we do not simply give something away with no conditions attached to it.

Senator LONG. Yes.

Mr. JOHNSON. And here we have really broken some ground and have a new policy of some significance, I think.

Senator LONG. Here is a broad question that I personally feel should be considered. It is the interest of the public in general, when paying for something, to get the most we can for our tax dollar. My thought is that we certainly ought to consider whether, as a matter of governmental policy, when we pay huge amounts of money to have things developed and worked out and where the taxpayers have paid for it, that they should get the maximum possible benefit of it. And what would be the maximum benefit?

It occurs to me that the maximum benefit might very well be secured not only by making the item available to all, but that the taxpayer should not have to pay royalty and license fees thereafter to use something that he had already paid to have developed.

Let me give you a simple example. Billions of dollars have been spent by the Government, the taxpayers, in the field of atomic energy. The first time somebody develops an engine which could drive an automobile, and which is practical and safe, he would be in position to probably make more money out of the field of atomic power than the Government has spent. It would seem unfair that the taxpayer who has paid fantastic amounts of money in developing atomic energy, should have to pay all over again to the fellow who makes this final discovery.

Does that make sense to you, or not?

Mr. JOHNSON. I think the example you have cited in the atomic energy field makes a great deal of sense, yes, sir.

I do not think that that case—which is an extreme case, since atomic energy is a very new thing, considering the Government monopoly that has prevailed in that field during recent years—I do not think that that is a good guide to all the kinds of things in which our agency is involved in the field of aeronautics and space activities.

Here we are concerned with a vast range of technology, almost all of which has a considerable history behind it.

The field of electronics, the development of fuels, the field of metallurgy, the field of ceramics, all of these things are not just new because space flight is new. We come into midstream, or well downstream, in many of these cases, so it is not the same situation.

Senator LONG. Yes.

Mr. JOHNSON. But I think we have to bear this in mind: When we say here that there is a prima facie case for waiver when the invention has only incidental utility in the conduct of activities with which NASA is particularly concerned, and has substantial promise of commercial utility, I think we must realize that in such a case the purpose of the research and development contract must have been performed, that NASA and the Government and the public must have derived the benefit that was intended from that research and development contract, without acquiring rights to this particular invention.

In other words, we did not enter into that kind of a contract for the purpose of having this invention made, because, by the definition here, it is not the kind of invention that has, particular utility for our kind of work.

It happens to be an incidental byproduct of the work we are doing, so that it was not contracted for. It was not a motivation for entering into the contract.

The Government derived all the benefit it expected to get, so far as the meeting of the minds of the parties is concerned, when the contract was performed, and the research and development work was completed.

We did not enter into the contract for the purpose of acquiring patent rights to inventions having only incidental utility in our business.

Now, so far as the public interest is concerned, quite aside from our own narrow sphere of activity—and it is not really very narrow—we are concerned with that.

Senator LONG. Let me approach it a little bit more like this fashion, to pin it down specifically. Let us consider a case which has considerable equity, where a concern has spent a considerable amount of money in developing something like a fuel, for example.

I understand that in the petroleum industry, 98 percent of its research is done with private funds, and your contribution might only be a small portion of what they are doing on this overall effort. But let us take the case of where more than 98 percent of the funds, or even in many instances a hundred percent of the funds for development cost comes from the Government.

If the U.S. Government on behalf of all the people of the Nation, is paying to have something developed to promote the national inter-

est, and if a byproduct of this discovery is something of very substantial value, would it not seem that this byproduct should belong to the general public rather than to the person who actually discovered it?

The reason I say that is because every major corporation does just that in dealing with its own employees. In other words, when they discover something maybe that is not exactly what they are looking for, but if it has great value, they want the privilege of achieving that value and not leaving that to their employees.

Mr. JOHNSON. You have asked me several questions, Mr. Chairman.

If I may deal with the last part of it first, I would say that the relationship of the Government to a contractor is not like that of a contractor to an employee. The contractor is in the business of commercial exploitation of these patents to the best of its ability, and it actually exercises its patent rights to exclude others from competing with it, at least during the life of the patent.

The Government is not in that kind of business. If the Government does acquire the patents, it does not make the same kind of use of them that the company does, at all.

Senator LONG. If you think of the Government as being the people of this Nation, wouldn't you say they are in that business? They are certainly in the business of buying and using that product, otherwise the man would not produce it.

Mr. JOHNSON. They are in the business of buying and using the product that is produced. But they are not in the business of producing the product itself, and this makes the big difference, I believe, as far as——

Senator LONG. But you are not in the business of producing the product yourself either. You are in the business of buying, if you are an employee of the Government. But if you look upon the Government as being all the people of the United States, 170 million of them, they are in the business of buying that product, too, once for the use of their Government, of all the people collectively, and a second time for the use of the citizens individually and in a private capacity.

Mr. JOHNSON. Let me deal with the first part of that this way. So far as Government purchases are concerned, we do have a royalty-free license that runs not only to the Government but all of its contractors, so the Government is always protected from paying again for that particular invention.

Mr. GORDON. Excuse me, but using Senator Long's equation of the people equals the Government, you say if the people paid for the R. & D. work and something is developed, one person gets the title.

Now, the people will pay more because that one person has the title and will be able to secure monopoly profits—in this case the people would not reap the fruits of the research and development which they paid for. If the Government takes title, on the other hand, and puts it in the public domain, and if the item is produced by many people, then this particular item——

Mr. JOHNSON. If you assume all those hypothetical facts, I could not disagree with you. But I do not think there is any assurance things would work that way any more than another way.

Mr. GORDON. But you are making assumptions, too.

Mr. JOHNSON. Yes, I am, because I have to explain the policy which we now have, and the reasons that motivated it.

But may I speak about that particular——

Senator LONG. I am going to urge that we all withhold further questions from you, Mr. Johnson, until you get through answering the questions which have been already put.

Mr. JOHNSON. I do not believe that one can necessarily conclude, because patent rights have been left with a contractor responsible for the invention, that the people of the United States are going to pay more for the enjoyment of the product which incorporates that invention.

In the first place, while the patent holder could license someone else and charge a royalty on the thing, we must assume that he may choose, and more probably would choose, to go ahead with the development of it himself and use the patent primarily for protection while incurring the risk involved in the initial development of that article. In that case he uses it just as every patent holder uses a patent, and this is one of the main reasons for having a patent system.

Now, I am not arguing with the basic premises of the U.S. patent system. This, I think, is quite beyond my province as an attorney for NASA.

I have assume that the U.S. patent system does have a sufficient justification and that we are expected to administer this law with due deference to the traditional justification of that system.

But I do think that the retention of patent rights by the contractor in that case could very well have the effect of hastening the development of that invention to the point of practical application and making its benefits actually available to the public.

Whereas, if no one had any patent rights, which would be the effect typically of the Government taking title, no one would have a sufficient incentive to incure the risks of initial development of the product. That is the other side of the picture.

Mr. GORDON. Mr. Johnson, the experience of the Tennessee Valley Authority, the AEC, and the Department of Agriculture indicates that the facts are just the opposite; that putting something into the public domain so that anybody can use it, and anybody could be licensed, does not discourage anybody necessarily from investing.

You are, in essence, saying, as I understand it, that you have to have a monopoly position as an incentive to invest.

Mr. JOHNSON. I would like to take those agencies in order. I cannot speak about the Department of Agriculture, but I do not believe that we have yet reached the point in the private development of atomic energy where one can make that kind of a statement about the policy of the Atomic Energy Commission.

So far as the TVA is concerned—basing my remarks on the report recently submitted by a Senate subcommittee—TVA has had no contractor inventions. That relates entirely to the inventions of Government employees and, of course, our policy is substantially the same as theirs in that case.

Mr. GORDON. TVA did some developmental work. It obtained a patent on a rotating electric furnace. It does not have any contracts outstanding right now, but it has had contracts outstanding at one time in the field of fertilizer. It has licensed many fertilizer manufacturers.

The Department of Agriculture has licensed many manufacturers who are glad to get the license.

Mr. JOHNSON. I am sorry. I thought the report said that it dealt entirely with the policies in relation to TVA's own employees.

Mr. GORDON. I am talking about the Government and its relations with its contractors, not with its employees.

Mr. JOHNSON. Yes; I know.

Shall I go on then with a summary of this statement?

The fourth category is very closely akin to the previous one, and it relates to the situation that the chairman mentioned in describing the petroleum industry, where the invention is directed specifically to a line of business of the contractor with respect to which the contractor's previous expenditure of funds in the field of technology to which the invention pertains has been large in comparison to the amount of funds for research or development work in the same field of technology expended under the contract of the Administration in which the invention was conceived or first actually reduced to practice.

Now, the next portion of the statement proceeds to discuss the conditions under which waivers are granted, and here I think we have done some real ground breaking.

We feel that one of the purposes of the patent system is not fulfilled if it is used for the purpose of suppressing the use of an invention.

So we have provided here that waivers will be voidable at the option of NASA unless the recipient of the waiver shall on or before the end of the fifth year from the grant of a U.S. patent on such invention, or the end of the eighth year from the date of acceptance of the waiver, whichever is sooner, demonstrate to the Administrator that the invention has been developed to the point of practical application or that the invention has been made available for licensing either royalty free or at a reasonable royalty rate.

I think I should say one more thing more about our waiver policy. Contractors have requested that we include in our contract provisions certain assurances that inventions in certain classes will be waived if such inventions are made.

We have taken the position that that type of contract provision would be inconsistent with the apparent purpose of section 305. It appears to us that we should not grant waivers in advance of the making of the invention because of the great difficulty, if not impossibility, of determining with any degree of assurance that the interests of the United States would be served by waiver before the precise nature of the invention is known. So we have not included in our contracts any such provisions, and we have informed contractors that this matter is not open to negotiation.

Now, subsection 305(g) of the act provides that the Administrator shall determine the terms and conditions upon which licenses will be granted by the Administration for the practice by any person of any invention for which the Administrator holds a patent on behalf of the United States.

Since we have only recently acquired title to a few patents, we have not yet been pressed to develop the comprehensive regulations on licensing.

We have devoted our time rather to the initial problems of contract regulations and contract provisions and our waiver regulations, but we are prepared to announce certain policies concerning licensing.

It will be NASA policy to grant a nonexclusive, royalty-free license to the contractor responsible for the making of the invention which becomes the property of the United States pursuant to subsection 305(a).

But this license also, like the waiver that I described before, will be revocable at the option of the Administrator if the recipient of the license fails before the end of the eighth year from the date of the grant of the license or before the end of the fifth year from the date of the issuance to the Administrator of a U.S. patent on the licensed invention, whichever is earlier, to demonstrate to the Administrator that the invention has been developed to the point of practical application.

We would propose, during this period in which the contractor holds a revocable royalty-free license, to grant other nonexclusive licenses, revocable on the same conditions, to qualified applicants.

Then we feel if the invention has not been worked by the end of this period that I have just mentioned, it would be reasonable to conclude that a factor precluding development of the invention was the lack of exclusive rights which are ordinarily available under the patent system to justify the risk of development.

In that case we could revoke all the outstanding licenses and consider the granting of an exclusive license for the purpose of developing the invention within a specific period of time.

Failure to comply with that condition of working the invention again would be ground for revocation of the exclusive license. We feel that we could implement this policy by publishing a list of all patents available for grant of an exclusive license.

You asked that we comment on the economic effect of NASA's patent policies.

These patent policies are new. They are the newest patent policies in the Government. We do not feel that there has been sufficient experience with them yet to be able to give more than a very speculative answer on the economic effect of those policies.

However, we do feel that the policies are designed to do two things which we think are in keeping with the traditional justification of the patent system.

We feel that they do provide an incentive in appropriate cases, to take the risks necessary to develop an invention to the point of practical application so that its benefits are reasonably available to the public; and we also feel that the conditions which we would impose upon both waiver and licenses prevent, or ought to prevent, the suppression of the inventions.

We feel the invention should be worked, and that it would be contrary to the public interest either to waive the Government's rights to an invention or grant a license, and then permit the grantee merely to suppress the invention for the purpose of perpetuating a monopolistic position.

Our judgment, therefore, is that these policies are designed to favor rather than impede economic progress overall.

The subcommittee also asked for our recommendations.

I am in the position of having to repeat substantially what we said last week to the subcommittee of the Science and Astronautics Com-

mittee of the House, which held extensive hearings on our proposals for new patent legislation.

We have taken the position that section 305 of our act should be replaced by a provision substantially like that which the National Science Foundation presently has in its act.

This provision would give NASA discretionary authority concerning the disposition of property rights in inventions conceived or first actually reduced to practice in the performance of NASA contracts.

Senator LONG. Do you think if you ever had that right we would ever find you entering into a contract which would say that after the Government pays to develop something it would be agreed that the Government could not use it for the benefit of the public, in general? That was in one of their contracts.

Mr. JOHNSON. That the Government could not use it?

Senator LONG. For the benefit of the public, yes, in general. That is what we got for that.

Mr. JOHNSON. This has a very strange sound to me, Senator, so I do not know precisely what you are speaking of.

Senator LONG. That is one of their extremes, but they handed to us a typical contract, and then we find it is not typical.

Here is what we got for that:

> The contractor agrees to, and does hereby, grant the Government an irrevocable nonexclusive, nontransferable and royalty-free license to practice—

and so forth—here is the sentence I wish to read to you:

> No license granted herein shall convey any right to the Government to manufacture, have manufactured, or use any subject invention for the purpose of providing services or supplies to the general public in competition with the contractor or the contractor's commercial licensees in the licensed field.

Do you think we might get that result from you that you would agree, after we paid to develop something that the license given to you would not permit the thing to be used for the benefit of the general public?

Mr. JOHNSON. Mr. Chairman, you have read right from the provision of the Armed Services Procurement Regulation clause, and that very same clause is incorporated in paragraph (g) (i) of our property rights and inventions clause.

Now, that particular paragraph of our clause——

Senator LONG. You find this language—

> shall convey any right to the Government to manufacture, have manufactured, or use any subject invention for the purpose of providing services or supplies to the general public in competition with the contractor or the contractor's commercial licensees in the licensed field?

Mr. JOHNSON. Yes, sir; that is in our clause, but it only has a narrow application at the present time.

This part of our contract clause only applies to inventions to which rights have not been vested in the Government pursuant to the provisions of section 305, that is, inventions which are not made under the conditions specified in the statute.

Now, it is possible that you might have an invention reported under the contract which was not made under the particular conditions enumerated in the statute. We felt we should have a contract clause covering those inventions to be sure that we acquired, at least, a

royalty-free license in those inventions; and in doing that we followed the Armed Services Procurement Regulation clause.

This is an additional clause in our contracts applicable only to those inventions not made under the conditions specified in section 305(a).

Senator LONG. Do I understand that clause is in the Department of Defense contract, as well?

Mr. JOHNSON. Yes, sir.

Senator LONG. Well, now we see where it came from. They say it is not typical over there in the National Science Foundation—that is not typical at all—that it was an unusual case. But it is the usual case I take it, in the Department of Defense.

Could we expect that to be a usual thing if we gave you the power to do it as we gave it to the National Science Foundation?

Mr. JOHNSON. I think the answer is "Yes" to that. Although I do not want to say at this time we are going to adopt——

Senator LONG. Here is a good example of the kind of thing I had in mind. Did you hear those people testify this morning?

Mr. JOHNSON. No, sir.

Senator LONG. Well, they have a weather modification program to try to see what can be done about controlling weather. It has been indicated to me, for example, that just down from where I come from we have too much rainfall most of the time, rather than too little.

We have droughts sometime, but more frequently our problem is too much rainfall. If you could make the clouds shed their rain before it gets to the heavily populated areas, we could save an awful lot of working days for our contractors. We could save a lot of money if the clouds dropped the rain in the swamps or out in the Gulf of Mexico, especially when we already had all the rain we could use out there anyway.

That would be one good use of weather control. Some people want to make it rain in their areas, but so far as we are concerned we would more often have it rain somewhere else. It is cutting into our construction time.

So if someone under this type of contract actually found how you could practically seed these clouds and make that result occur, he would then be in a position to tell the U.S. Government it could not use that discovery for the benefit of our people there, and that they could not—anyone who used it, would have to be licensed by this fellow who got the U.S. money to develope it in the first place. We would have to pay whatever his price was which, I would assume, would be all the traffic could bear even after we paid to develope it.

That is the practical application of what this could mean.

Mr. JOHNSON. It could if it were used in that case. I think that one has to discriminate, of course, in the use of clauses of this kind.

If we were contracting for something that was likely to produce that kind of invention, I think there would be serious question as to whether this would be an appropriate clause to use.

But what this is really designed to do is to prevent the Government from entering into competition in the production of the invention in ordinary commerical commodities. That is the other extreme, too.

So one has to recognize the vast variety of situations we are dealing with here.

You have mentioned an extreme case at one end of the spectrum, but I think there are legitimate cases at the other end where this is quite an appropriate provision.

Senator LONG. You would not recommend the policy that you have recommended here to your board of directors if you were representing a corporation, would you?

Mr. JOHNSON. I would not recommend any policy on this subject, Mr. Chairman. I do not understand that I recommended——

Senator LONG. As I understand it you are recommending a change in the Department of Defense policy. You are recommending a policy that after the Government paid for inventions it should let the private concern have patents on them, and if I understand your testimony—and we have seen that it has not worked out where it has been done—it winds up with causing the taxpayer to pay more money.

Mr. JOHNSON. I would like to say——

Senator LONG. It costs them more to get it.

Mr. JOHNSON. I would like to see a particular case under a Department of Defense contract that had the kind of result you mentioned as a horrible example.

But, let me make my own position clear. I did not say that we were asking the Congress to codify the Department of Defense policy in the law applicable to NASA. I said that we have a variety of situations here. We are compelled by the nature of the technology in which we are engaged to contract with many companies that are already deeply involved in business with other Government agencies having divergent patent policies as the committee well knows. We are asking for broader discretion than we have in the present act to follow the policies of those agencies where we deem it appropriate.

I think I made it clear in my testimony last week that we do not intend slavishly to follow the policies of the Department of Defense.

We recognize that there are considerations peculiar to NASA that might justify different policies. As a matter of fact, I testified that I saw no reason at all why NASA should not continue to impose the kinds of conditions upon licenses that we are imposing in our regulations now, to make sure that the use of whatever rights the contractor retains, are actually utilized for the purpose of developing the invention to the point of practical application and making its benefits accessible to the public.

The Department of Defense does not do that now. This is a policy we have developed in NASA, and which I think is a good one.

But we do have this situation, Mr. Chairman, and it is the situation that basically motivates our request for legislation. All of our major contractors, without exception, I think, are contractors, with a long history of doing business with the Department of Defense. They have important contracts with the Department of Defense right now.

As a matter of fact, the Department of Defense or the military services are administering contracts in our behalf in many cases. The law provides for our utilization of their services in this respect to avoid duplication in the Government.

There are outstanding contracts between X company and the Department of Defense, which were in existance before NASA came along, involving the very same kind of technology, the very same

prospective inventions, the very same research and development organization as the NASA contracts.

Yet just because the Congress appropriates money for this particular contract to NASA, and it comes out of NASA's pocket, the contractor faces an entirely different patent situation for an invention produced under the NASA contract from what it does with respect to an invention produced under a Department of Defense contract.

We think this is not good government. It is indefensible for a government to conduct itself in that fashion.

It is inequitable for a contractor to have his rights, whether one believes they are justifiable or not, to be determined on such a quixotic basis. We think we ought, in that particular case, to deal more along the lines that the Department of Defense is dealing than we can at the present time.

On the other hand, we also have the AEC which has its own peculiar patent provisions and laws which have been described this afternoon.

We would like also, when we are engaged in that kind of business, to be able to adapt our policies to those of the Atomic Energy Commission.

Senator LONG. It seems to me that when you bring your law in here we can get you fellows to get a consistent policy by getting the DOD and you to go to the Atomic Energy Commission policy rather than putting you over the other side.

Now, the effort was made up here a short time ago to pass a bill which the administration recommended, to give those corporations title on things which were developed by Government research in the field of atomic energy. This was the subject of a very heated fight in the U.S. Senate, and I think the Senate decided that issue correctly. It was a very bitter fight, but it was decided in favor of maintaining AEC policy.

We have not had a debate on this Department of Defense policy, but I see no reason why Congress should not debate it, so that the problem is fully understood. I see no reason why Congress will not reach the same conclusion about the Department of Defense that it reached about the AEC.

Now, this thing you are talking about here, your policy and this latitude you have, I imagine you got that out of conference, did you not? Did you get that in the House of Representatives?

The latitude that you can give these fellows to waive these patent rights, did you get that out of the House of Representatives?

Mr. JOHNSTON. Mr. Chairman, it came out of conference. I am not prepared this afternoon to—I would have to get the earlier version to tell exactly what changes were made.

This did come out of conference, and it was a new provision so far as I can recollect.

Senator LONG. Didn't you tell me that the House passed the bill that had a provision similar to the Atomic Energy policy?

Mr. JOHNSON. No, sir. I did not say similar to the Atomic Energy policy. I said it had a provision somewhat similar to the one that finally came out in our act. Of course, this is more like the AEC provision than anything else.

Senator LONG. This one here?

Mr. JOHNSON. Yes, sir; and then the Senate knocked it out entirely in passing the bill, and then this particular version was agreed upon in conference.

Senator LONG. Does this give you more latitude or less latitude than the House bill gave you?

Mr. JOHNSON. Mr. Chairman, I would have to go back and reexamine the earlier versions to be able to give you an answer. Would you like to have me supply this for the record?

Senator LONG. Yes. Would you provide me with the House bill as introduced, as reported by the committee, and also a copy of the House report so we can see just how this got this way.[29]

Did the Senate liberalize it, that is, as a result, did it strike it out, and did you get a more liberal clause or did it mean, as a result of striking it out and going to conference, that you had less discretion about the matter? I would be curious to know.

Mr. JOHNSON. Yes, sir. I can certainly provide the earlier versions of the bill.

My recollection is that there was no committee report at all on this. This is one of those very remarkable pieces of legislation that has practically no legislative history in the record.

Senator LONG. Seeing a thing of this sort, I will be frank to tell you, my reaction is that if you people are paying 100 percent of Government funds to have something developed, and then you are letting this fellow have a private patent on it, which gives him certain monopolistic rights, my question would be, How did we come to do this?

My second reaction is that this is the kind of thing you would get out of conference somewhere. You do not see it going in. Then we get it back, and we rush it through on a conference report which is how we probably did it. That would be my reaction to the practice of paying 100 percent to have something developed and then letting a private firm secure all rights to it and enabling the firm to charge the taxpayers again for it.

Suppose you give me the memorandum[30] and see what the House thought about it when they passed the bill initially.

Mr. JOHNSON. Surely.

May I complete my statement concerning this proposed legislation?

Senator LONG. Yes, sir.

Mr. JOHNSON. We have, in recommending this legislation, sought to avoid making any ultimate judgments concerning the wisdom of taking title rather than taking a license to inventions produced under Government contracts.

This is a subject that has been debated both in the executive and legislative branch of the Government for years, as the chairman knows, without any uniform policy having been adopted, either by the executive or the legislative branch of the Government.

We have a variety of legislation, so far as the legislature is concerned. We have a variety of practices so far as the executive branch is concerned.

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[29] H.R. 12575, H.R. 11881 (H. Rept. 1770), S. 3609 (S. Rept. 1701), conference report (H. Rept. 2166), 85th Cong., 2d sess. H.R. 12575 became Public Law 85–568, approved July 9, 1958.

[30] See exhibit XII(B), p. 271, for history of the patent provisions of the National Aeronautics and Space Act of 1958, subsequently furnished by Mr. Johnson.

We feel that it is a very difficult question even to determine whether a uniform policy is desirable.

I heard Mr. Anderson's testimony, and I recall that he felt there were grave questions as to whether a uniform patent policy was a desirable thing, given the great variation in missions of the different agencies of the Government.

But we know, in any event, that this is a question which has been debated for many years. So far as I am concerned, I cannot be certain that it ever will be resolved, nor do I know how soon it will be resolved, if ever.

In the meantime, we have some more proximate problems to face. We have the problem of daily negotiating contracts with contractors, and we have the problem of a responsible Government trying to deal with some equity with those contractors.

So far as I am concerned, the very first principle of equity is equality, and I think that a legal regime which subjects the inventions of contractor X working for the Defense Department to one result, while subjecting the inventions of contractor Y working for NASA on substantially indistinguishable type of work to a different result, is inequitable. I think Congress could well deal with that as a proximate problem before coming up with a final solution to the question of title versus license.

Senator LONG. Thank you very much, Mr. Johnson. Do you have any further questions you want to ask?

Mr. GORDON. Just one.

Has your particular policy retarded the placing of important R. & D. contracts?

Mr. JOHNSON. I think Mr. O'Brien who has been engaged in some of these negotiations would like to answer this.

Mr. O'BRIEN. I would say it has definitely retarded the placing of important R. & D. contracts. Our present patent policy has retarded the placing of important R. & D.

Senator LONG. Can you give us a list of some of the contracts you have had difficulty in placing?

Mr. O'BRIEN. Yes, sir. But I would like to amplify my statement in this respect, I think that in a greater majority of the cases where we have had negotiating difficulties we have resolved these difficulties during the negotiation process.

We have been faced with the responsibility, with the problem of explaining the provisions of our act as we now interpret them.

The problem of explaining the provisions of our regulations which have only recently been published, has caused delays. They have not been insurmountable in the majority of instances.

There are some instances where we probably will not be successful in placing contracts.

Mr. GORDON. But the contractors are beginning to learn to live with this NASA provision, are they not?

Mr. O'BRIEN. Unquestionably, yes.

Mr. JOHNSON. I think I should say, too, that we have not based our request for new legislation essentially on this consideration.

Senator LONG. Let me just suggest to you if you are hoping to get this legislation through, don't hold your breath until it goes through.

Mr. JOHNSON. Mr. Chairman, we are busily engaged in administering the law as it now stands, and we will continue to do that.

Senator LONG. Thank you very much.

(The following information was subsequently supplied by the National Aeronautics and Space Administration:)

EXHIBIT XII(A). NASA'S PATENT POLICY—LIST OF CONTRACTS NASA HAD DIFFICULTY IN PLACING

Statements requested during hearings before the Subcommittee on Monopoly of the Select Committee on Small Business, U.S. Senate, December 9, 1959

Mr. Gordon asked whether NASA's[1] patent policy has retarded the placing of important research and development contracts and Mr. Johnson asked Mr. O'Brien to reply to Mr. Gordon's question. Mr. O'Brien stated that the NASA patent policy, in his opinion, definitely has retarded the placing of important research and development contracts. Senator Long then asked for a list of some of the contracts that we have had difficulty in placing. The list follows with a discussion of the difficulties:

Case No. 1.—The Westinghouse Electric Corp. believes that it has made some very basic and fundamental discoveries in the technique of maintaining and regulating an arc discharge in a gaseous medium. The discoveries which Westinghouse Electric has made in connection with arc discharge resulted from its studies over the years of the phenomena of arc discharge. It appeared to technical representatives of Westinghouse Electric that these recent discoveries could well have application to the development of high-velocity wind tunnels capable of producing velocity of the order of mach 15.

Westinghouse Electric informally inquired of NASA whether or not a contract for research and development with NASA to apply its discoveries in the field or arc discharge to the development of a high Mach number wind tunnel would permit it to retain commercial rights in inventions made in the performance of such a contract. Westinghouse Electric appeared to believe that there would be further demand for such wind tunnels not only by the Government but by industry, and the retention of commercial rights in such inventions would enhance its competitive position in constructing wind tunnels, utilizing its techniques. Westinghouse Electric was advised that the only way in which it could accomplish this objective would be to receive a waiver under subsection 305(f) of the NASA Act, as implemented by NASA regulations. Since subsection 305(f) provides for the granting of waiver by the Administrator of NASA upon recommendation of the NASA Inventions and Contributions Board, no assurance could be given in advance that a waiver would be granted in a specific instance. NASA's patent waiver regulations provide that waiver may be granted if it shown that the invention has only incidental utility in the conduct of activities with which the Administration is particularly concerned, and has substantial promise of commercial utility. It would appear that any invention in the field of wind tunnel design would not be said to have only incidental utility in the conduct of activities with which NASA is concerned. Accordingly, this provision for waiver offered little promise that a waiver of the Government's rights in these inventions could be obtained.

Another provision in the regulations for waiver is where it is shown that the invention is directed specifically to a line of business of the contractor with respect to which contractor's expenditure of funds in the field of technology to which the invention pertains has been large in comparison to the amount of funds for research and development work in the same field of technology expended under the contract of the Administration in which the invention was conceived or first actually reduced to practice. Whether or not inventions would qualify for waiver under this provision would depend upon facts not ascertainable in advance of a contract. None of the other provisions in NASA's regulations for waiver appeared to offer Westinghouse Electric better hope of obtaining commercial rights in new inventions. In view of these factors, Westinghouse Electric is still considering whether to submit a contract proposal to NASA. It should be added that Westinghouse Electric has contracts with NASA in fields of technology where it does not regard its commercial position as being so critical.

Case No. 2.—The Motorola Co. has made certain discoveries in photographic processes and techniques which appear to have substantial promise of commercial utility. These discoveries in photographic processes and techniques were

[1] National Aeronautics and Space Administration, Washington, D.C.

made independently of any Government sponsorship and are presently the exclusive property of the Motorola Co. It appears, however, that these photographic processes and techniques may have application in the solution of problems of photography in space exploration. Officals of the Motorola Co. approached NASA to suggest a research and development contract to apply these techniques to problems in outer space photography but desired to ascertain whether such a NASA contract would result in the Government acquiring rights to any inventions involved in the foregoing discoveries. Moreover, the Motorola Co. desires to continue its own research and development program in the commercial applications of these new photographic techniques and processes, and, therefore, desires to retain commercial rights to all new inventions.

It is the policy of NASA not to acquire, except by direct purchase, rights in inventions that have been actually reduced to practice prior to the placing of a contract with NASA. Because the investigations undertaken by Motorola are still in an experimental stage, some questions remain as to whether or not their present state of development would, in each case, be considered as an "actual reduction to practice." If any of the inventions were to be first actually reduced to practice in the performance of the NASA contract, subsection 305(f) of the act would require that the Government retain, as a minimum, a license under such inventions even though the Administrator were to waive title to the contractor, as provided by the NASA patent waiver regulations. Whether or not the commercial rights to any new inventions conceived in the performance of the contract could or would be waived to Motorola would depend upon whether the invention qualified under the waiver regulations and upon the judgment of the Administrator acting upon the advice of the NASA Inventions and Contributions Board.

In view of these considerations, the officials of Motorola are in doubt as to the desirability of making a contract proposal to NASA to support the investigation.

Case No. 3.—The General Electric Co., under contract with an agency of the Department of Defense, had successfully completed the basic research and study to indicate the applicability to missile guidance of certain phenomena previously discovered by the General Electric Company relating to superconductivity. NASA desired to join with the Department of Defense in entering into a new contract with the General Electric Co. to apply these discoveries in superconductivity to space vehicle guidance. Such joint sponsorship would necessitate incorporation in the contract of the NASA patent provisions which are less favorable to the contractor than those of the Department of Defense. The contractor refused to take the contract under such joint sponsorship, and presumably this investigation, if undertaken, will have to be supported solely by the Department of Defense. It should be added that the General Electric Co. is participating under research and development contracts with NASA in many other areas of research and development. Its reluctance to accept NASA's support in this specific case evidently was attributable to its unwillingness to grant to the Government rights under inventions previously conceived but which might be first actually reduced to practice in the performance of such a contract, as it would be required to do by section 305 of the act.

Case No. 4.—Narmco Industries, Inc., of San Diego, Calif. was requested by NASA to undertake some research investigations bearing upon the development of new structural materials for outer space application which would involve the impregnation into plastic or metal structures of fibers or disklike flakes of ceramic or glass materials. Narmco would be responsible for the development of the end material but would be required to seek from the glass or ceramic industries the improved fibers and disklike materials which were to be incorporated into the plastic or metal matrix. On investigation, Narmco found that the glass and ceramic industries were reluctant to participate in this program if their participation would subject them to the patent provisions of the NASA Act. Because of these difficulities, this proposed investigation did not materialize. However, it is understood that Narmco has accepted contracts from the military services for such work.

Case No. 5.—The Associated Piping Engineering Co. of Compton, Calif., has apparently developed, independently of any Government sponsorship, a novel process for welding tungsten containing alloys. The company claims to have a well-established proprietary position in this field. It appears that the process developed by Associated Piping could be applied to tungsten or molybdenum to acheive a NASA objective which is important to the space program. The

NASA patent provisions, which would be required in such a contract, are presently delaying the placing of a contract with this firm.

Case No. 6.—The Electric Storage Battery Co. was requested by McDonnell Aircraft Co. a prime contractor in Project Mercury, to accept a subcontract for the development of a battery to be used in the manned capsule. Since the research and development to be undertaking pursuant to this request would parallel the Electric Storage Battery Co.'s own sponsored research program, and since the inventions emanating from this undertaking would be subject to the patent provisions of the NASA Act, Electric Storage Battery refused to enter into this subcontract with McDonnell Aircraft Co. Had it not been for the development of an alternative power supply by another NASA contractor, the refusal of Electric Storage Battery to take a subcontract with McDonnell Aircraft merely because of the NASA patent provisions could have seriously impaired or delayed Project Mercury.

Case No. 7.—The Lesona Corp. subsidiary of Patterson-Moof Corp. was approached by NASA to develop a carbon dioxide analyzer for use in Project Mercury. Lesona, the owner of patents for this subject matter, had granted an exclusive license to another firm under all inventions covered by its patents and all improvements therein. Under the NASA patent provisions required in the proposed NASA contract, the Government would acquire rights in all inventions made in the performance of work under the contract and Lesona might be held to have violated the terms of its exclusive license agreement. Even though Lesona wanted to accept the NASA contract, the company decided that it would be in its best interests to refuse the work with NASA.

The foregoing examples typify the difficulties encountered as a result of the patent provisions of the NASA Act. However, there is reason to believe that many other industrial firms are reluctant to do business with NASA because of the patent provisions of the act. NASA would not be aware of this reluctance because these firms have not been seeking business with NASA. We understand that the Industrial Nucleonics Corp. has, in testimony before the Congress, indicated its reluctance to do business with the Atomic Energy Commission because of the patent policy of AEC. We also understand that Industrial Nucleonics, for the same reason, will not do business with NASA. It is also understood that the Garrett Corp. of Los Angeles would be unwilling to accept contracts with NASA in fields of technology related to their commercial business if inventions would be likely or necessary in the fulfillment of the work requirements of the contract.

Exhibit XII(B). History of the Patent Provisions of the National Aeronautics and Space Act of 1958

The bill entitled "An act to provide for research into problems of flight within and outside the earth's atmosphere, and for other purposes (H.R. 12575),[1] passed by the House of Representatives on June 2, 1958, contained the following provision under the heading "Patent Rights":

"Sec. 407. (a) Any invention or discovery made or conceived under any contract, subcontract, arrangement, or other relationship with the Administrator, regardless of whether the contract or arrangement involved the expenditure of funds by the Administrator, shall be deemed to have been made or conceived by the Administration, except that the Administrator may waive the Administration's claim to any such invention or discovery under such circumstances as the Administrator may deem appropriate.

"(b) In any case where the Administrator waives the Administration's claim to an invention or discovery as authorized by subsection (a), the Administrator shall retain the full right to use such invention or discovery in carrying out his functions under this Act and to license other persons on such terms and conditions as he may deem appropriate to use such invention or discovery in the conduct of any activities authorized by or under this Act. In any such case the Administrator may provide for the payment by the Administration or by the other persons licensed under this subsection, for the use of the invention or discovery, of a reasonable royalty fee determined by the Administrator in accordance with such standards and procedures as he may by regulation establish.

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[1] H.R. 12575 became Public Law 85–568, July 29, 1958 (85th Cong., 2d sess.).

"(c) In any case where the Administrator does not waive the Administration's claim to an invention or discovery which is deemed to have been made or conceived by the Administration under subsection (a), the Administrator may grant to the person who made or conceived the invention or discovery, as compensation therefor, a cash award in an amount determined by the Administrator in accordance with such standards and procedures as he may by regulation establish."

The report of the Select Committee on Astronautics and Space Exploration on H.R. 12575 (H. Rept. No. 1770, 85th Cong., 2d sess.) contains the following comment on the foregoing section:

"Subsection (a) provides that any invention or discovery made or conceived under any contractual or other relationship with the new agency shall belong to that agency, unless the Administrator waives the agency's claim to such invention or discovery.

"Subsection (b) provides that where the Administrator waives the agency's claim to an invention or discovery made or conceived under such a relationship, he shall retain the right to use the invention or discovery in carrying out his functions and to license it to others for use in carrying out the activities authorized by the act; and in any such case he may pay or require any licensee to pay the inventor or discoverer a reasonable royalty for the use of the invention or discovery.

"Subsection (c) authorizes the Administrator, in any case where the new agency's claim is not waived under subsection (a) and the invention or discovery accordingly becomes its property, to pay the inventor or discoverer a cash award as compensation for the invention or discovery."

The bill reported by the Special Committee on Space and Astronautics of the Senate on June 11, 1958 (S. 3609), contained a substantially similar provision. The report of the committee on the bill (Rept. No. 1701, 85th Cong., 2d sess.) contains the following comment on this provision:

"The bill provides that any invention or discovery made or conceived under any relationship of any character with the agency, whether or not agency funds are involved, is deemed to have been made and conceived by the agency, but that the Director may waive the claim of the United States under appropriate circumstances.

"When the Director waives any claim, he is required to retain for the United States the full right to use the invention or discovery in carrying out his functions and to license other persons to use the invention or discovery in carrying out agency activities. The Director is authorized to provide for the payment by the agency or other persons a reasonable royalty fee in accordance with standards and procedures established by regulation.

"When the Director does not waive the claim of the United States to an invention or discovery, he may grant to the inventor or discoverer, as compensation, a cash award in an amount determined by him in accordance with standards and procedures established by regulation."

This provision of the bill was deleted on the floor of the Senate when the bill was passed on June 16, 1958.

The conference report (H. Rept. 2166, 85th Cong., 2d sess.) contains the following comment:

"The House bill contained a section on 'Patent Rights' which in essence provided that—

"(1) The United States should receive title to any invention or discovery made or conceived under any contract or other arrangement with the Administration.

"(2) The Administrator could waive title to such discoveries at his discretion, but in such instances was required to retain the 'full right' to use the invention for Government purposes. He could further license other persons to use the invention on terms and conditions to be promulgated by him.

"(3) The Administrator was authorized, in cases where title was retained in the Government, to make cash compensation awards in accordance with regulations to be determined by him.

"The Senate eliminated a similar section entirely in order to permit further consideration of the problem in conference.

"Operating on the theory that the Government's interests must be protected, but with the concomitant purpose of protecting private interests and of keeping private incentive and initiative at a high level, the committee of conference adopted entirely new patent provisions."

PREPARED STATEMENT OF JOHN A. JOHNSON, GENERAL COUNSEL OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. Chairman, I appreciate your invitation to appear before this subcommittee in connection with its study of the patent policies of the departments and agencies of the Federal Government and the effects of these policies on economic concentration, competition, and small business. In accordance with your request, my statement today will outline the patent policies of the National Aeronautics and Space Administration, the economic effects of those policies, and the recommendations of the Administration for legislative changes.

NASA'S PATENT POLICIES

NASA's patent policies are to be found in section 305 of the National Aeronautics and Space Act of 1958, and in the patent and procurement regulations of the Administration.

Section 305 of the act, entitled "Property Rights in Inventions," provides in subsection (a) that inventions made in the performance of work under NASA contracts shall be the exclusive property of the United States whenever the Administrator makes certain statutory determinations concerning the conditions under which the invention was made, unless the Administrator waives all or any part of the rights of the United States to such inventions. In its entirety the subsection reads as follows:

"(a) Whenever any invention is made in the performance of any work under any contract of the Administration, and the Administrator determines that—

"(1) the person who made the invention was employed or assigned to perform research, development, or exploration work and the invention is related to the work he was employed or assigned to perform, or that it was within the scope of his employment duties, whether or not it was made during working hours, or with a contribution by the Government of the use of Government facilities, equipment, materials, allocated funds, information proprietary to the Government, or services of Government employees during working hours; or

"(2) the person who made the invention was not employed or assigned to perform research, development, or exploration work, but the invention is nevertheless related to the contract, or to the work or duties he was employed or assigned to perform, and was made during working hours, or with a contribution from the Government of the sort referred to in clause (1).

such invention shall be the exclusive property of the United States, and if such invention is patentable a patent therefore shall be issued to the United States upon application made by the Administrator, unless the Administrator waives all or any part of the rights of the United States to such invention in conformity with the provisions of subsection (f) of this section."

NASA has developed a special "Property Rights in Inventions" clause to facilitate administration of the foregoing statutory provision. This clause is required to be included in every NASA contract, or modification of a contract, which entails technical, scientific, or engineering work of a kind performed in a contract having as one of its purposes (1) the conduct of basic or applied research, (2) the design or development, or manufacture for the first time, of any machine, article of manufacture, or composition of matter to satisfy NASA's specifications or special requirements, (3) the development of any process or technique for attaining a NASA objective not readily attainable through the practice of a previously developed process or technique, or (4) the testing or experimenting with a machine, process, or technique to determine whether the same is suitable or could be made suitable for a NASA objective.

NASA considers that a contract made by another Government agency on behalf of NASA is a "contract of the Administration" for the purpose of applying subsection 305(a) of the act. Accordingly, NASA has requested that its special contract clause be included in such contracts if they meet the foregoing criteria. These criteria, of course, exclude contracts for the purchase of standard commercial off-the-shelf items.

The "property rights in inventions" clause provides that a contractor shall furnish to the contracting officer written reports containing full and complete technical information concerning any invention made in the performance of any work under the contract. Such reports shall be furnished promptly upon the

making of such an invention. As a policing device, the clause requires the contractor to furnish such a report promptly after the execution of the contract with respect to inventions made before award of the contract but upon an understanding in writing that a contract would be awarded. For the same reason, a final report prior to final settlement is required in which all reportable inventions must be included, whether or not covered in prior reports. While the term "invention" is defined in the clause as including a discovery, improvement, or innovation, the contractor is not required to report every trifling discovery, improvement, or innovation that may be made under a NASA contract. However, doubt as to whether a given invention is reportable should be resolved in favor of furnishing the report.

In addition, the "property rights in inventions" clause states the agreement of the parties that any invention made in the performance of work under the contract shall be presumed to have been made by a person described in paragraph (1) or (2) of subsection 305(a) of the act, and under the conditions therein described, if the contractor fails to take any of certain actions specified in the clause, one of which is to submit to NASA a written statement setting forth the details of the circumstances under which the invention was made. The Administrator is thus enabled to make the determinations called for by subsection 305(a) either on the basis of the agreed presumption, on the basis of information submitted by the contractor, or on the basis of facts independently ascertained by NASA.

In the event it is determined that the invention has been made under circumstances causing it to become the exclusive property of the United States, NASA will file the necessary patent application if the invention is patentable and is likely to be used in the public interest, unless the Administrator waives the rights of the United States in the invention. If it is determined that the invention was not made under circumstances causing it to become the exclusive property of the United States, the "property rights in inventions" clause provides for the granting by the contractor to the Government of an irrevocable, nonexclusive, nontransferable, and royalty-free license to practice the invention throughout the world.

In this situation, when the invention has not become the exclusive property of the United States by operation of subsection 305(a) of the act, the contractor is required to specify whether or not a U.S. patent application has been or will be filed by or on behalf of the contractor. If the contractor specifies that a U.S. patent application will be filed, the contractor is obligated to file or cause the same to be filed in due time and form. However, if the contractor specifies that a U.S. patent application has not been filed and will not be filed, the contractor is required to convey to the Government the contractor's entire interest in such invention and to execute the necessary instruments to permit the Government to prosecute patent applications covering the invention.

The "property rights in inventions" clause also obligates the contractor to include clauses in each subcontract which follow substantially the provisions of the prime contract pertaining to patents.

It should be noted that NASA's regulations provide that in no event shall the price of a NASA contract be increased merely because of the inclusion of the "property rights in inventions" clause in the contract.

As mentioned above, subsection 305(a) of the act provides that inventions determined by the Administrator to have been made under the conditions therein specified shall become the exclusive property of the United States "unless the Administrator waives all or any part of the rights of the United States to such invention in conformity with the provisions of subsection (f) of this section." Subsection (f) provides that each waiver of rights of the United States to an invention made under a NASA contract may be upon such terms and conditions as the Administrator shall determine to be required for the protection of the interests of the United States, and shall be subject to the reservation by the Administrator of an irrevocable, nonexclusive, nontransferable, royalty-free license for the practice of such invention throughout the world by or on behalf of the United States or any foreign government pursuant to any treaty or agreement with the United States.

In the exercise of authority under subsection (f), NASA is guided by the fundamental policy that the granting of a waiver is in the interests of the United States where the stimulus of private ownership of patent rights will encourage the development of an invention to the point of practical application more rapidly and with greater benefit to the public than would otherwise be the case.

NASA has establish criteria by which inventions are grouped into two general classes—first, those inventions not generally eligible for waiver; second, those inventions with respect to which a prima facie case for waiver may be established. Concerning the first class, it is NASA's policy that the interests of the United States would not generally be served by waiver of its rights with respect to any invention which is (1) primarily adapted for and especially useful in the development and operation of vehicles, manned or unmanned, capable of sustained flight without support from or dependence upon the atmosphere, or (2) of basic importance in continued research toward the solution of problems of flight without support from or dependence upon the atmosphere. With respect to the second class, NASA considers that a prima facie case that the interests of the United States would be served by waiver of title shall have been established when:

(1) It is shown that the intention was conceived prior to and independently of, but was first actually reduced to practice in the performace of work under a contract of the Administration, and the invention is covered by a U.S. patent issued or application filed prior to the award of the contract; or

(2) It is shown that the invention was conceived or first acually reduced to practice in the performance of a contract of the Administration for research work with a nonprofit organization whose primary purpose is the conduct of scientific research, and the contract does not call for the delivery of models or equipment or the development of practical processes; or

(3) It appears that the invention has only incidental utility in the conduct of activities with which the Administration is particularly concerned and has substantial promise of commercial utility; or

(4) It is shown that the invention is directed specifically to a line of business of the contractor with respect to which the contractor's previous expenditure of funds in the field of technology to which the invention pertains has been large in comparison to the amount of funds for research or development work in the same field of technology expended under the contract of the Administration in which the invention was conceived or first actually reduced to practice.

All waivers, except those granted on inventions developed to the point of practical application prior to the request for waiver and waivers granted on inventions conceived prior to and independently of, but first actually reduced to practice in the performance of work under a contract of the Administration, will be voidable at the option of the Administrator unless the recipient of the waiver shall, on or before the end of the fifth year from the grant of a U.S. patent on such invention or the end of the eighth year from the date of acceptance of the waiver, whichever is sooner, demonstrate to the Administrator that: (1) the invention has been developed to the point of practical application, or (2) the invention has been made available for licensing either royalty free or at reasonable royalty rate. Development "to the point of practical application" means the manufacture, practice, or operation of the invention under such conditions as to establish that the invention is being worked or that its benefits are reasonably accessible to the public.

It may be noted that subsection 305(f) of the act provides that the Administrator may waive all or any part of the rights of the United States "with respect to any invention or class of inventions made or which may be made * * * in the performance of any work required by any contract of the Administration." It has been contended that this provision gives the Administrator authority to grant waivers in advance of the making of an invention and to include the granting of such waiver in NASA contracts. NASA, however, has adopted the policy of not granting any waivers in advance of the making of the invention because of the great difficulty, if not impossibility, of determining with any degree of assurance that the interests of the United States would be served by waiver before the precise nature of the invention is known.

Subsection 305(g) of the act provides that the Administrator shall determine the terms and conditions upon which licenses will be granted by the Administration for the practice by any person (other than an agency of the U.S. Government) of any invention for which the Administrator holds a patent on behalf of the United States. Regulations on the subject of licenses have not been as urgently needed as regulations prescribing contract provisions and waiver of rights in inventions. Although NASA's patent licensing regulations have not yet been promulgated, certain basic policies have been developed in the course of their preparation.

It will be NASA policy to grant a nonexclusive, royalty-free license to the NASA contractor responsible for the making of an invention which becomes the

property of the United States pursuant to subsection 305(a) of the act. This license will be revocable at the option of the Administrator if the recipient fails before the end of the eighth year from the date of the grant of the license or before the end of the fifth year from the date of the issuance to the Administrator of a U.S. patent on the licensed invention, whichever is earlier, to demonstrate to the Administrator that the invention has been developed to the point of practical application. NASA would propose during this period of time, which should be adequate in most instances for new-product development, to grant other nonexclusive licenses, revocable on the same conditions, to qualified applicants. If the invention has not been worked by the end of this period, it would be reasonable to conclude that a factor precluding development of the invention was the lack of exclusive rights, typically available under the patent system, which would justify the risks of development. NASA would be in a position to rectify this situation by revoking all nonexclusive licenses and granting an exclusive license under the condition that the invention would be developed within a specified period of years. Failure to comply with the condition would result in revocation of the exclusive license. Such a licensing policy could be implemented by publishing a list of all patents available for grant of an exclusive license. No patent subject to an outstanding nonexclusive license would be included on the list.

EFFECTS OF NASA'S PATENT POLICIES

It is not possible to do more than speculate about the economic effects of NASA's patent policies. Section 305 of the National Aeronautics and Space Act has been in effect only since October 1, 1958, and the reporting of inventions made in the performance of NASA contracts has occured only during recent months. To date, NASA, has had nine inventions reported by contractors, of which seven have become the exclusive property of the United States. Determination of rights in one invention is still pending, and there is also pending one petition for waiver of rights. This experience is obviously insufficient to permit conclusions concerning the economic effects of section 305 and the policies of NASA thereunder.

The debate between the proponents of the Government's taking title to contractors' inventions and those who favor acquiring only a royalty-free license for Government use has been carried on with vigor for many years. Although no uniform answer has been provided either by the executive or legislative branch, there seems to be general agreement on certain ends to be served by the Government's patent policies.

The first of these is that it is in the public interest to encourage the earliest and widest use of inventions. As a corollary to this proposition, the necessary means must be found to preclude the suppression of inventions made in the performance of Government-financed research and development work.

In the second place, there is general agreement that the American patent system does provide a stimulus for the risktaking that is necessarily incurred in the development and introduction of a new or improved product. Thus, the taking by the Government of title to inventions might well have an adverse effect upon economic progress, since loss of the protection of the patent could impede the commercial development of certain inventions.

NASA has endeavored to take each of these considerations into account in developing its patent policies. NASA's waiver and licensing policies, we believe, are devised to assist in bringing to the public at the earliest date the benefit of those inventions which appear to have substantial promise of industrial utility, of contributing to more efficient methods of production of goods and services, or of creating new and improved products. The NASA policy of conditioning the waiver of rights or the granting of licenses upon the development of an invention to the point where its benefits are accessible to the public within a reasonable time is intended to preclude any possible suppression of the invention by the recipients of the waiver or license. It is hoped, therefore, that the overall effect of NASA's policies will be to aid, rather than impede, economic progress.

RECOMMENDATIONS

Quite aside from the anticipated economic effects of NASA's patent policies, which are speculative at best, section 305 of the National Aeronautics and Space Act of 1958 has certain consequences which make legislative action desirable.

I have recently proposed, in my testimony before the Subcommittee on Patents and Scientific Inventions of the Committee on Science and Astronautics of the House of Representatives, that section 305 of the National Aeronautics and Space Act of 1958 be replaced by a provision which will give the NASA discretionary authority concerning the disposition of property rights in inventions conceived or first actually reduced to practice under NASA contracts calling for experimental, developmental, or research work. Such authority is necessary to enable NASA to avoid creating inequities in its dealings with private contractors.

NASA's contractors are largely from those segments of American industry which do most of the contracting with the Department of Defense in defense aspects of the aeronautics and space field. In most cases, not only the same industrial units are involved, but essentially the same technology forms the basis for both NASA and Department of Defense contracts. Often contracts are jointly sponsored. Since NASA practice required by the present law differs from that of the Department of Defense, the disposition of patent rights in inventions under contracts which are basically similar and often with the same contractors may depend solely upon whether the source of funds in NASA or Department of Defense appropriations. From an equitable as well as an administrative standpoint, it is believed that the Government ought to deal equally, regardless of the agency involved, with contractors engaged in substantially similar work. To this end, in almost every procurement aspect except patents, NASA has the same legal authority and has adopted the same policies and practices as the Department of Defense in conducting its business with contractors. The single exception concerning property rights in inventions, however, is of the utmost importance to contractors. In order to assure itself of the continuing willingness of contractors to participate in projects of great national importance, NASA desires that it be given discretionary authority to adopt contractual patent provisions in line with those of the Department of Defense where necessary to meet the equities of the situation.

The Atomic Energy Act, on the other hand, requires that "any invention or discovery, useful in the production or utilization of special nuclear material or atomic energy, made or conceived under any contract, arrangement, or other relationship with the Commission" shall be deemed to have been made by the Commission, except that the Commission may waive its claim to any such invention or discovery. This statutory standard is also at variance with subsection 305(a) of the NASA Act. If the legislation which we are proposing were enacted, it would enable NASA to adopt patent provisions in its contracts identical with those of the Atomic Energy Commission in cases where the production or utilization of special nuclear material or atomic energy is involved.

In addition, it is desirable to reduce the administrative complexities of the present act. The processing of inventions to comply with subsection 305(a) and the consideration of requests for waiver of the Government's rights involve much procedural detail which may well be unjustified from a purely economic point of view.

Finally, there is the adverse reaction of contractors themselves to the patent provisions of the act. While this opposition may, in the typical case, be overcome in the process of negotiating a contract, it can retard the placing of important research and development contracts. Moreover, NASA would prefer to be dealing with willing contractors, competitively eager to participate in the research and development necessary to advance the Nation's space efforts.

The amendment which has been suggested is substantively like the legislation enacted in 1950 for the National Science Foundation (40 U.S.C. 1871). The principle of that legislation is to authorize the adoption of contract provisions, taking either title or license, whichever will protect the public interest and the equities of contractors. The enactment of such legislation for NASA, in lieu of section 305 of the National Aeronautics and Space Act of 1958, would eliminate inequities to contractors, lighten NASA's administrative burden, and minimize contractor opposition, all of which, in our opinion, will serve the best interests of the national space program.

Senator LONG. I am not going to call any more witnesses today. I had hoped to be able to call one more witness, but we will ask the witnesses to come back tomorrow and we will proceed as expeditiously as we can.

We will meet at 10 o'clock and we will call Mr. Falvey as the first first witness tomorrow.

Thank you so much.

(Whereupon, at 5:30 p.m., the subcommittee recessed to reconvene tomorrow, Thursday, December 10, 1959, at 10 a.m.)

PATENT POLICIES OF DEPARTMENTS AND AGENCIES OF THE FEDERAL GOVERNMENT

THURSDAY, DECEMBER 10, 1959

U.S. SENATE,
SUBCOMMITTEE ON MONOPOLY
OF THE SELECT COMMITTEE ON SMALL BUSINESS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:10 a.m., in room 457, Old Senate Office Building, Senator Russell B. Long, presiding.

Present: Senator Long.

Also present: Walter B. Stults, staff director; Benjamin Gordon, economist; T. Peter Ansberry, counsel; Hamilton Richardson, legislative assistant to Senator Long.

Senator LONG. The subcommittee will come to order.

Our first witness will be Mr. Falvey.

Will you please summarize your statement, if you can, in about 10 minutes.

Mr. FALVEY. I think I can, Mr. Chairman.

STATEMENT OF JAMES P. FALVEY, DEPUTY ASSISTANT SECRETARY OF DEFENSE (SUPPLY AND LOGISTICS); ACCOMPANIED BY G. C. BANNERMAN, DIRECTOR, OFFICE OF PROCUREMENT POLICY; HOWARD WILLIAMSON, OFFICE OF PROCUREMENT POLICY; R. TENNEY JOHNSON, OFFICE OF GENERAL COUNSEL, DEPARTMENT OF DEFENSE; CAPT. R. A. FITCH, U.S. NAVY, ASSISTANT CHIEF OF NAVAL RESEARCH FOR PATENTS; AND D. C. SNYDER, OFFICE OF NAVAL RESEARCH

Mr. FALVEY. I am James P. Falvey, Deputy Assistant Secretary of Defense (Supply and Logistics). I appreciate your invitation to appear and discuss Department of Defense policies on patents and on the acquisition and dissemination of data. For the convenience of the committee, I would like to summarize the main points of my prepared statement, which I understand has been received for the record, and finally, our views on the pertinence of these policies to small business and the problem now before this subcommittee.

Reduced to essentials, the Department of Defense patent policy is, in any contract having experimental, developmental, or research work as one of its purposes, to obtain a royalty-free, nonexclusive license to use any invention conceived or first actually reduced to practice in the course of performing the contract work. The Government thus has the right to have any manufacturer it chooses produce the pat-

ented article for the use of the Government without payment of royalties to the patent holder. Generally, however, the contractor retains title to the patent and the right to collect royalties on all commercial business. If the contractor elects not to file a patent application on an invention, he must convey all his rights in the invention to the Government. The Government may thereby acquire title to an invention originated in the performance of contract work for the Department of Defense, for defensive purposes.

Moreover, of course, the Department may contract and pay for the reservation of title to inventions in the Government. However, to do so would be a departure from the general policy.

Historically, the patent policy of the Department of Defense was and is the result of operating experience of the Department and the Military Departments prior to the establishment of the Department of Defense. Our experience under the present policy has been good and no changes of concept are needed to satisfy Department of Defense requirements.

The mission of the Department of Defense is the defense of the United States, and the Armed Forces must be provided with weapons which incorporate the most advanced technology. In order to obtain such weapons, it is necessary to compete with the demands of the civilian market for the scientific, technological, and engineering resources of American industry because we depend upon industry to produce the weapons we need. Realistically, it must be recognized that industry is in research to design and create products to sell. Research must have a production line pay-off. Requiring indiscriminately that title to the inventions resulting from Government work be vested in the Government would impair our ability to secure the research services of qualified and competent firms, since one great incentive, commercial exploitation of resulting patents, would be lost.

In regard to the acquisition and use of technical data in a contract which has as one of its principal purposes experimental, developmental, or research work, and calls for models of equipment or practical processes, the contractor is required to furnish for the price of the work all data resulting directly from the performance of the contract necessary for reproduction or manufacture of the equipment or performance of the process which is developed.

In supply contracts, "proprietary data," if obtained, is subject to specific negotiation and listed as a contract item. When the Government wishes to establish additional sources of supply it obtains the data without limitation as to use. However, if the Government's needs are limited to a specific purpose such as emergency manufacture, the data is subject to limitation.

The need for "proprietary data" to establish additional sources of supply arises when it is necessary to insure fulfillment of current and mobilization requirements or to establish competitive sources to avoid unreasonable prices. If neither of these conditions is present, the contracting officer is free to make repetitive purchases of equipment from the original developer. This policy honors the "proprietary data" developed at the expense of the contractor and gives effect to our policy of fostering private development of items having military usefulness.

The dissemination of scientific and technical information is of interest to this committee.

Technical information embraces a spectrum which runs from simple instructions on how to use equipment, maintain it, and to manufacture it to the most learned treatises on scientific phenomena, human behavior patterns, and the social and applied sciences.

This material is distributed or made available through the Library of Congress, the Office of Technical Services of the Department of Commerce, the Armed Services Technical Information Agency (ASTIA), and the National Science Foundation, to name a few of the sources.

The committee has requested an analysis of the economic effects of our patent policies, particularly in relation to concentration, competition, and small business.

Whether this contributes to economic concentration is a matter upon which there is a dearth of facts upon which to base an objective judgment. We have no objective judgment on the question. Any subjective judgment must recognize that concentration of economic power can result from many factors, such as good management, ability to control basic resources, and many others, including through patents a recognized legal monopoly. To identify the many elements and to assign such elements their relative weight falls outside the mission of the Department of Defense. However, we are participating in a study of the question through membership in study group 14, referred to in my prepared statement. (See p. 338.)

With respect to effect of our patent policy on competition, we take into account that we are operating in an economy which is based on a competitive free enterprise system. The patent system is an integral part of that system. We have considered how we should fit our treatment of the division of rights in inventions in such a system. It must be recognized that a U.S. patent is a legal monopoly. It rewards the inventor by giving him the power temporarily to exclude others from using the invention he patented. It gives him time and incentive to develop and market the invention, thus making it available for public use. Our policy recognizes this fact.

The competitive advantage resulting from inventiveness and ingenuity is lost when it is placed in the public domain, as would be the case in Government-held title. The right to exclude, considered to be an inducement and an incentive to dispose personnel and plant resources to the development and commercial exploitation of the invention is lost. Would this capital be so disposed if the innovator knew that anyone could copy the invention with impunity?

I am sure the committee would be interested in knowing the views of the Small Business Industry Advisory Committee to the Department of Defense. In October 1957, one of the members proposed that small business should be exempted from the requirement of the grant to the Government of a royalty-free license. The Committee considered the question and on February 4, 1958, passed the resolution quoted below:

That it is the sense of this Committee that small business does not wish preferential treatment, but equitable treatment, as compared to big business; It is further

***Resolved,* That with express regard to patent rights resulting from research and development contracts with the armed services, that it is recommended that the Department of Defense preserve its existing policy of taking royalty-free licenses on inventions conceived and reduced to practice at its expense but**

not including any background inventions conceived and reduced to practice by the contractor prior to receiving the research and development contract.

To conclude, Mr. Chairman, I consider our patent policy is in the best interest of the United States. It is designed to provide the incentive for American industry to undertake the scientific and development work so sorely needed in our present and future weapons. If we are to forge ahead in this age of rapid technological development and resulting rapid obsolescence, we must continue to recognize, respect, and encourage all the inventive genius which this Nation can muster.

Senator LONG. Thank you very much, Mr. Falvey.

Does the Department of Defense do some of its own research?

Mr. FALVEY. Yes, sir.

Senator LONG. Is it included in your contracts with your scientists or is it just a matter of Federal law, that, anything they develop for you belongs to the U.S. Government?

Mr. FALVEY. Are you talking about employees of the Department of Defense?

Senator LONG. Yes, Federal employees.

Mr. FALVEY. I think, perhaps, one of these men can answer that.

Mr. BANNERMAN. It is a matter of statute.

Mr. WILLIAMSON. Mr. Johnson can answer that.

Mr. JOHNSON. It is Executive Order 10096 which governs the rights of a Government employee in inventions.

Senator LONG. Can you state it briefly?

Mr. JOHNSON. The Executive order says that when people are hired to produce inventions, the Government shall take a title to that invention, receive an assignment of it.

It also says that where his invention is performed during Government work or on Government time, that the Government will also receive an assignment of that invention.

It provides that the Government will receive a license if it is not related to the duties of the employee; that is basically it.

Senator LONG. Here is a typical situation that I have some slight knowledge of. A person is working for the Army Engineers. He is working on a flood control structure.

He figures out in his spare time a way to make that structure open or close more efficiently. He does it in his spare time at home.

My understanding is that even though he does it in his spare time, because it is related to his work, the patent belongs to the Government.

Mr. JOHNSON. In effect, the result would be that he would obtain—he would retain the title to that invention done in his spare time. The way the policy is administered, that would be the effect.

Senator LONG. I would be curious to see what happened under those exact circumstances. You might check and see. It is your impression that if he did it in his spare time, it would be his private patent?

Mr. JOHNSON. That is the way the policy is administered; yes, sir.

Senator LONG. If he did that on Government time, that would be the Government's patent?

Mr. JOHNSON. Well, it would be subject to determination of whether the Government wished to retain or obtain title to that invention. In many cases the Government would decide it would not desire to have title to the invention. It would, however, reserve a license.

Senator LONG. Reserve what?

Mr. JOHNSON. A license.

Senator LONG. What factors would be involved in determining whether you can take title to an invention or not?

Mr. FALVEY. We are still talking, Mr. Chairman, about the Government employee?

Senator LONG. Yes, sir.

Mr. FALVEY. We are not talking about an outside contractor?

Senator LONG. That is right; we are still talking about the Government employee.

Mr. SNYDER. Will you repeat the question, sir, please?

Senator LONG. If a Government employee in the course of his work, makes a patentable discovery relating to his work, what factors would determine whether the Government would take the patent, or would permit him to keep the patent and merely take a license?

Mr. SNYDER. You start with the assumption that the invention is related to his official duties, I believe.

Senator LONG. Yes.

Mr. SNYDER. The rule that is followed by the Department of Defense, and actually under the final decisions of Chairman of the Patents Board, is that we take title only where the invention is directly related to his official duties. The word "directly" is quite important here.

If it has a mere remote relation, something of that nature, we take a mere license for the Government.

Similarly, if there is merely a contribution by the Government of facilities, material, time of other employees, and so forth, we take a mere license.

The key to the titletaking is in this language "directly related to the official duties of this inventor."

Senator LONG. Well, in some instances you would not, I understand, take title, even though it is directly related to his official work.

Mr. SNYDER. There are instances where the Government has absolutely no interest in this particular invention from the standpoint of whether we have any governmental need for the invention; and we do not even want to file a patent application on the subject matter.

In those situations the inventor sometimes is permitted to file a patent application at his own expense, subject to a Government license in the invention.

Senator LONG. Yes.

What I was trying to find out was what factors are involved in your decision that you would or would not take title when it is something the Government could use.

I cited a specific case of a man working on a flood control structure, and he finds a way to make the structure work better and more efficiently. It is patentable. It is of use to the Government.

It could, perhaps, be used by private industry.

Would the Government take title, and if so, what would be the factors that would determine whether the Government would take title or would not take title?

Mr. SNYDER. The main factor on whether we take title is this factor of whether it is directly related to his official duties.

Senator LONG. It is directly related.

Mr. SNYDER. All right.

Then we will take title in that invention if, in fact, we are going to use it for governmental purposes.

But if we have no need for it, we may permit the inventor to retain title and take the invention at his own expense, subject to Government license.

Senator LONG. Suppose private industry wants that title; suppose private industry could find that useful also, would you permit that inventor to have the patent rights on it for commercial exploitation?

Mr. SNYDER. It is conceivable that the invention would have only commercial use, absolutely no governmental use, and that title would be left in the employee in that situation.

Senator LONG. All right.

Now, back to you, Mr. Falvey. I think that what you and I are seeking, what, I hope, we are both seeking, is a method that will make our democracy work most efficiently and most effectively.

Mr. FALVEY. That is correct.

Senator LONG. I think that is what your statement has been directed to.

Mr. FALVEY. That is right, Mr. Chairman.

Senator LONG. In the handling of this program when you hire someone to do research and development work for the Government——

Mr. FALVEY. You are talking now about a contractor on the outside?

Senator LONG. Yes; I am now talking about an outside contractor.

Mr. FALVEY. Yes, sir.

Senator LONG. Is that person permitted to keep the information he develops to himself until the completion of the contract or until some particular point along the line?

Mr. FALVEY. You are talking about as the development progresses?

Senator LONG. Yes; as it progresses.

Mr. FALVEY. We engage a contractor to do a job for us——

Senator LONG. Yes.

Mr. FALVEY. (continuing). To develop something.

Senator LONG. Right.

Now, here is the point I have in mind.

As he goes along in attempting to develop, say an airplane or a missile——

Mr. FALVEY. All right.

Senator LONG. As he goes along, he finds ways to get certain things done; he learns things which in some instances are know-how, and in other instances, they are patentable items of information.

Mr. FALVEY. Right.

Senator LONG. Is he permitted to keep that information until some particular point or until the completion of the contract?

Mr. FALVEY. You are talking about the employee of, perhaps, or a group of employees, in the employ of a contractor?

Senator LONG. I am talking about the contractor.

Mr. FALVEY. OK.

Senator LONG. Here is the kind of thing I have in mind. You have two or three different contracts developing similar weapons—let us say aircraft and missiles—are these individual contractors permitted to keep to themselves the proprietary rights that they have in know-how and in technical information until some particular point, such as the completion of a contract?

Mr. FALVEY. I think, perhaps, one of these other men would be better qualified to answer that question than I am.

Mr. WILLIAMSON. In a research and development contract, I think that is what you are speaking about——

Senator LONG. Yes.

Mr. WILLIAMSON (continuing). The contract will provide for the delivery of data, and it varies as to when that data will be delivered in each contract.

This, of course, embraces the notion that data are periodically delivered whenever it is meaningful data. We do not just pick a date which happens to be convenient and then get part of the data. It is usually in some sort of an organized package.

Senator LONG. Well, suppose it is something like the development of the Titan missile, which we can use as a specific example. You may provide further information later for the record, if necessary, but I would like your best guess at the moment as to when data and technical information developed is delivered and made available generally?[30a]

Mr. WILLIAMSON. I think I would have to supply that answer in a general way. I do not know that particular case.

Senator LONG. What would be your guess?

Mr. WILLIAMSON. Well, I would guess that you would have, after you have an approved design for the——

Senator LONG. Pardon me.

Mr. WILLIAMSON. I say, after you have an approved design, you would proceed to work out that particular design so you would at least have the design data at that point.

Now, when you construct the prototype, you would then put that through a series of tests, and you would acquire a considerable amount of test data.

I think it would then depend on how long the test program was, whether the test was proceeding satisfactorily or just what the situation was.

It would be a little hard to predict exactly what sort of data were being generated and when.

Mr. BANNERMAN. Mr. Chairman, I would like to supplement that answer just a little, if I may, and in doing so I would like to differentiate between patentable inventions, on the one hand, and data on the other.

I think whenever a contractor arrives at an invention, he is required to make a disclosure to us on that invention. This comes in the form of periodic reports throughout the life of the contract.

With respect to data, you take a contract like the Titan, for instance, the Government has a large number of its own employees stationed in the plant of the contractor who is building the Titan, and they are aware at all times of what that contractor is doing, and what he is coming up with by way of data, and that data would be availble to them at any time it is requested.

Senator LONG. To the Goverment employees?

Mr. BANNERMAN. That is right.

Senator LONG. Suppose I am a contractor building a different missile. Suppose I am building the Polaris.

[30a] See app. XVI., p. 454., for information subsequently supplied re reporting of R. & D. data to the Department of Defense by contractors.

How readily is that information available to me when I am working on a different missile, but a closely related item?

Mr. BANNERMAN. Well, the exchange of data in a case like that would be via the Government, and I assume the answer to your question would be how efficient is the Government in performing this function, and I am not sure that I am prepared to answer that.

I think there is no question of secrecy involved. It is a question of how good a job are we doing in passing the data.

Mr. FALVEY. Mr. Chairman, may I ask a question?

Senator LONG. Yes.

Mr. FALVEY. You are talking about two different contractors, are you?

Senator LONG. Yes. Don't you have a different contractor on the Polaris from the one you have on the Titan?

Mr. FALVEY. Yes, sir.

Mr. BANNERMAN. Yes, sir.

Senator LONG. That is the point I have in mind. Many of the problems are identical, are they not? Many of the development problems——

Mr. FALVEY. Well, at least similar.

Senator LONG. Both of them are missiles, are they not?

Mr. FALVEY. Yes, but there are missiles and missiles, Mr. Chairman.

Senator LONG. Well, the Atlas and the Titan have a lot of smiliarity, do they not?

Mr. FALVEY. Right.

Senator LONG. And neither of them uses a solid fuel. They both use a liquid fuel, do they not?

Mr. FALVEY. That is correct. Maybe someone else is more technically disposed to answer that. I do not know whether they are solid or liquid.

Mr. WILLIAMSON. It is my understanding they are both liquid fuel.

Senator LONG. That is the point I have in mind. Both of them are missiles, and both use liquid fuel, and they both have a different design. They may be designed for a somewhat different purpose, but, generally speaking, the research and devolpment problems are almost identical.

I would like to know how readily available the information that one contractor develops is to the other contractor.

Mr. BANNERMAN. Mr. Chairman, the Government is supervising both developments. The Government would be quite remiss, I would assume, to allow any substantial amount of money to be expended in duplicative work if the work has been done once. Information should then be made by the Government readily available to the other contractor, and he could go on from there.

Senator LONG. And now, what is your reaction to this testimony that we had on our opening day, where a businessman said that he wanted to bid on a camera? He can sell it to you cheaper than his competitor can sell it, and he thinks he can give you a better product.

His testimony was that he could not get the data, the drawings, and information he needed to bid on it. In fact, in some instances he could not even see the camera that he was to bid on.[30b]

What is your reaction to that?

[30b] See statement of Mr. Peirez, p. 22.)

Mr. BANNERMAN. Mr. Chairman, I would need to know a good deal more about it than just that.

It would depend upon the circumstances under which we acquired the camera.

If we bought the existing camera under a supply contract, it is not our policy to pirate the technical information or data of the originating contractor simply because we buy his camera.

It is quite possible that we would not have data under those circumstances any more than we would have data on all of the details of a Ford automobile just because we bought one.

On the other hand, if we had paid for the development of the camera, if the Government had paid to have that camera developed, under our present policies we would have or should have certainly, all of the technical data necessary, and would have the right to make that available to others to build the camera.

Senator LONG. Suppose this is a case where this contractor had developed a camera under a contract with you, and, suppose he had certain information prior to the time that he received the contract from you, but he had received a very substantial amount of money—perhaps most of the money—for the development of this item from a Government contract.

Where would the competitor stand in that situation, and where would you stand?

Mr. BANNERMAN. These questions are never very simple, Mr. Chairman. I would like to answer that in several parts, if I may.

In the first place, we do not acquire in the course of the conduct of our research and development work, without paying for it separately, we do not acquire background patents; that is, we acquire no rights in patents which the contractor had prior to the time our contract was placed.

Now, so much for patents. Let us talk now about data rather than patents.

We do, under our policies with respect to data, acquire all data necessary to tell us how to make the article with, I think, two exceptions.

One is that if the research and development includes prior work of a commercial nature; in other words, if it includes a commercially available component, we do not ask our prime contractor how to make that component. It is on the market, and it can be bought by anybody else as well as us. We simply require that it be identified and described in some way so that some other contractor could buy the same component.

Similarly, if there is some other component which has been previously developed and sold before our contract was placed, we do not require that the owner of that, whoever he may be, and he may be a subcontractor, we do not require that he reveal to us proprietary data in such an item as that.

But we do find out how to make the end product, and data that tell us how to make the end product are then transferable to others.

Senator LONG. It would seem to me that it would be logical that when you make a contract to acquire something, that you put yourself in the position that in the future you could have it produced under competitive circumstances.

Mr. BANNERMAN. We agree completely, Mr. Chairman; and that is precisely what we do.

Senator LONG. Well, let us just assume that a contractor has a certain amount of information and he has a background patent or two relating to the development of any given item. It could be a camera or any one of many things.

It would seem to me that if you are going to spend a substantial amount of money to develop it beyond that point that you should require him, as part of the contract, to agree that the Government or anyone else that you cared to do business with in the future, would have the benefit of a license, for at least a reasonable consideration, to use these background patents and the initial know-how that this person might have had when he first signed the contract with you.

Mr. BANNERMAN. Well, you are getting to the question of what do we buy, and what do we pay for, and I think it is safe to say it is not our normal practice to buy in conjunction with a simple cost-type contract a lot of what may be very valuable background patent rights.

If we intend to go into a production program thereafter, there is nothing to prevent us from going in separately and buying a license against such background patents, and this we frequently do. But it would be a separate negotiation for that license.

Senator LONG. But, generally speaking, when you enter into these research and development contracts, you do not undertake to acquire the right to use prior patents in the event that you want someone else to develop the same item?

Mr. BANNERMAN. Not generally speaking; no. Generally, we buy only that which is developed under our contract, but we are certainly able to buy background patents if we choose to.

As a matter of fact, if we run into any trouble on it, we have the statutory authority to infringe them, if necessary, which is sort of an enforced negotiation.

Senator LONG. Well now, we had testimony here by a small business concern [31] that had been unable to bid on the maintenance of instruments against General Electric; that he has been able to do the work at anywhere from half to 10 percent of the costs that General Electric was charging, and yet in many instances he was unable to acquire the parts from General Electric to meet delivery dates because a considerable number of the parts were exclusively in the possession of General Electric. He submitted a letter or letters which tended to support that position. (See exhibit II, p. 47.)

What is your reaction to that?

Mr. BANNERMAN. Well, I think that my answer to that would be somewhat similar to my answer to one of your earlier questions, Mr. Chairman.

If we buy an instrument or a device or anything else from General Electric under a supply contract, we do not thereby acquire any rights in the data or information concerning that item under such a contract.

Senator LONG. Suppose you made a contract with them to provide it, I mean, to develop the same data?

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[31] Statement of Harry Stern, president, Action Manufacturing Co., p. 44. See also statement of General Electric, app. X, p. 435.

Mr. BANNERMAN. That is quite a different matter. Our policy with respect to what data we get under a development contract is entirely different from that under a supply contract. But I must assume in the case you mentioned, because of the fact that it does not seem to agree with our normal policy under research contracts, that we acquire the product originally under a supply contract and, hence, we do not have these rights

Mr. ANSBERRY. When you buy aircraft instruments which have to be repaired after so many hundreds or thousands of flying hours, you do not at that time acquire enough information to enable you to repair the instruments, do you?

Mr. BANNERMAN. I'm sorry, I did not hear the question.

Mr. ANSBERRY. I say, you buy aircraft instruments under a supply contract. These instruments are known when you buy them that they would require overhaul after so many thousands of flying hours, yet you do not acquire at that time sufficient information and data to enable you to repair the instrument?

Mr. BANNERMAN. We would ordinarily get with a supply contract a maintenance and overhaul manual which would be just as you get with an automobile.

This would normally give you the information necessary to overhaul it. It would not get us parts, and I gather from what the chairman said the problem in this case was getting parts.

Mr. ANSBERRY. The problem was both parts and data, as stated by the Viewlex—or the Action Co. and the General Electric letter.

Mr. BANNERMAN. I do not know of any equipment offhand that we have bought without any ability to repair it.

The Government itself is in the repair business, as you know. We have many maintenance and overhaul shops; certainly in the aviation industry this is true.

I am not aware of any great problems in getting these maintenance and overhaul manuals, this information, to operate those shops.

I assume that such information would also be available to a contractor if the work is contracted out.

Mr. ANSBERRY. Should not your contracts so provide?

Mr. BANNERMAN. Maintenance and overhaul data that we get in connection with any contract are specifically available to the Government for any use it cares to make of it. Such data do not normally include any proprietary information.

Senator LONG. Well, let us look at a case where you pay four times as much to have to maintain your equipment as it would cost you if you let other people bid on the business.

Should you not, in the first instance, have protected yourself from that by requiring that you have drawings to the parts, and the right of others to make the parts, so that in the event the contracor did what General Electric [32] here is alleged to have done, you could protect the Government's interest by getting the work done at 25 percent of what it would cost if the original producer decided to overcharge you?

Mr. FALVEY. Mr. Chairman, may I ask a question before attempting to answer that question?

Senator LONG. Yes.

[32] See General Electric statement, app. X, p. 435.

Mr. FALVEY. Your previous question, I believe, was directed to the matter of nonavailability of parts.

I did not understand there was any patent or technical question there. It was a question of getting the flow of parts; am I correct in that?

Senator LONG. Well, to me it makes no difference whether the parts are patented or not patented.

Mr. FALVEY. That is what I say.

Senator LONG. It is the matter of availability of parts; and my question is should not the Government, in acquiring the instrument, anticipate the repair problem and obtain whatever contracts or information was necessary to guarantee that the parts would be readily available to competitors of the producer of the initial equipment?

Mr. FALVEY. In some instances, Mr. Chairman, the concurrent spares are ordered with the product for service and maintenance.

Senator LONG. How about the case when the components are not ordered with the products? In other words, you say that in some instances you actually get spart parts with the product, so that you will have them when you need them.

Mr. FALVEY. Concurrent spares are run at the time of the production run—I am taking an ordinary simple thing like an instrument.

Senator LONG. Let us take the next step. How about in the case where you do not do that? If you are not going to buy the spares, should you not at least make sure that the spares will be readily available at a reasonable price?

Mr. FALVEY. I do not think there is any argument about that, Mr. Chairman. It is just a question of the source of the spare parts. I do not understand that there is any patent question.

Senator LONG. Do you think that should be done? Do we agree so far?

Mr. FALVEY. Yes, sir.

Senator LONG. Now let us take the next step.

Mr. FALVEY. All right.

Senator LONG. Now assuming that the item under discussion is patentable or it involves trade secrets or other proprietary rights, in that instance should you not either assure yourself that the parts would be available or, in the alternative, if you have not acquired the parts or assured their availability, should you not take a license to let some of your other contractors make those parts and have the technical data available so that they can be readily made?

Mr. FALVEY. You are differentiating, as I understand it, between rights under background patents and rights under a patent for development of the article?

Senator LONG. Let us take it step by step. First, we have eliminated the problem where we have the parts.

Mr. FALVEY. That is no problem.

Senator LONG. Now we come to a situation such as the witness testified about 2 days ago, where you did not have the parts to provide to him. He had to get the parts.

Mr. FALVEY. Right.

Senator LONG. And the parts were not available because the manufacturer of the original item would not provide them.

Now, would it not have been desirable, when you made the contract to acquire the original item, to have secured a license to make these parts and sufficient technical information so that someone could readily make them if the manufacturer did not see fit to provide the parts to his competitors?

Mr. FALVEY. I answer that question, "Yes," with this qualification, that the question suggests that there may have been some patent complication. I am assuming that you are reading that into the question.

Senator LONG. Yes. If there is a patent complication you could have taken care of that in the original contract if you had stipulated that you would have the license to use that patent at a reasonable fee.

Mr. FALVEY. If the article were developed under an experimental contract we have got that right.

Senator LONG. But even if it was not developed under an experimental contract, and even if there were certain patents involved which were not the result from Government-sponsored research, you could have negotiated for a license to use those prior patents for a reasonable fee if that were necessary, isn't that correct?

Mr. FALVEY. That is right. If we wanted to buy that; if we wanted to negotiate for that, we would then be negotiating a license under background patents, so to speak, as I understand your question.

Senator LONG. Yes.

Wouldn't that be very important?

Mr. FALVEY. Well, as the witness testified, if it is something that appears necessary or desirable, such a license can be negotiated today.

Senator LONG. Yes.

Mr. FALVEY. Am I right, Mr. Bannerman.

Mr. BANNERMAN. Yes, that is true.

But, Mr. Chairman, it is not normally our policy in conjunction with the supply contracts to try to use the admitted economic power that we have to force people to give up valuable property rights without paying them for it.

I think that it would be possible in many instances to get background patent data, and to get the background know-how or technical data in connection with supply contracts if we elected to do so as our policy.

But the fact of the matter is the people who would be forced to give that to us would be those who would be in an economically weak position. A company that is in a good strong bargaining position would always tell you to go peddle your papers. They are not interested in giving up these valuable property rights, and I think such a policy across the board would be very unfair, for instance, to small business, because they are the ones who are hungriest, and probably would be most compelled to give up these background rights.

We do not feel that it is fair just because we buy an item at the going price for that item to expect to get a lot of other things, namely, all the background know-how of the company.

If we pay for that know-how, if we pay to have it developed, why, sure, we should get it, but not by the mere act of buying something on the market.

Senator LONG. Well, let us take a case where you are going to spend $10 million or $100 million to develop a given item. The person who is seeking the contract to develop it may have certain information,

certain know-how, and he may have one or two patents which may or may not be valid. Let us assume some of them are valid. Perhaps he acquired that at the expense of only $75,000 or $100,000. Yet, so long as he retains those prior patents nobody else could manufacture that article, even you could not manufacture it for yourself.

Why should you sign a contract for $10 million or $100 million and leave that contractor in a position that you could not even manufacture it for yourself in the future if you desired to do so.

Mr. BANNERMAN. Mr. Chairman, if we had any desire whatsoever or any indication that there would be the manufacture of this item by ourselves or by any other contractor at any time in the future, I am sure we would acquire such background patent rights under the circumstances you mentioned.

You must realize that our policy in this respect is an across-the-board policy. We do not normally acquire background patents because we do not normally pay for them. Such patents should be paid for if you buy them.

Captain FITCH. Mr. Chairman, could I say say something? I think I know what you are getting at, and something that has not quite been said.

If we have any reason for having a second source of supply or third or fourth for reasons of our military need, we do not want to rely on one source or if we are getting an unreasonable price from the sources we have, then we have authority in calling for bids for this item to give out the information, the best we have, as to how that item is made, by bidders. We have authority under our statute to infringe that patent and go right ahead and make it anyway.

We might attempt to negotiate in the case you gave.

Senator LONG. What do you have to establish in order to infringe that patent?

Captain FITCH. Only that we need it, sir. The statute permits us——

Senator LONG. Only that you need it or that you cannot get it at a reasonable price?

Captain FITCH. No, sir; we may infringe any patent under the statute, and the patent owner's only recourse, sole remedy, is by a suit in the Court of Claims against the United States.

We do not override, overrun these, if we can avoid it. We like to get a license on a reasonable basis. But what we do quite frequently is to authorize our people who bid, respond to a call for a bid, authorize them to infringe a patent which exists, the patent owner may complain and may make a claim against the Government, but that is a separate matter entirely.

Senator LONG. How frequently have you infringed patents?

Captain FITCH. Quite frequently, sir.

In the Navy we have a regulation whereby we are required, that the Secretary requires that before the patent is infringed intentionally and knowingly, that he authorize the infringement based on the needs of the Navy.

Senator LONG. Could you provide me with a memorandum, and I would like it not just for the Navy but for the Defense Department, setting out the instances in which patents have been infringed during the last year, for example? I think I would be curious to see how infrequently that has happened.

Captain FITCH. Yes, sir; we can. We have a large number of claims for that very thing.

EXHIBIT XIII(A)

INFORMATION SUBSEQUENTLY SUPPLIED BY MR. BANNERMAN, RE PATENT INFRINGEMENTS

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE,
SUPPLY AND LOGISTICS,
Washington, D.C., January 21, 1960.

The SELECT COMMITTEE ON SMALL BUSINESS,
U.S. Senate.

GENTLEMEN: This will supplement my letter of December 16, 1959, with respect to material to be furnished for the record of the hearings before the Subcommittee on Monopoly of the Select Committee on Small Business on December 10, 1959.

At page 556 of the transcript of hearings the following appears:[23]

"Senator LONG. Could you provide me with a memorandum, and I would like it not just for the Navy but for the Defense Department, setting out the instances in which patents have been infringed during the last year, for example? I think I would be curious to see how frequently that has happened."

The Department of the Navy was assigned the job of providing the answers to Senator Long's question, and their findings are quoted below:

"It is frequently alleged by patent owners that their patents are being infringed by the Department of Defense. For example, in fiscal year 1959 patent infringement problems were presented as follows:

	Department of the Army	Department of the Navy	Department of the Air Force
Patent infringement claims filed for administrative settlement under 10 U.S.C. 2386	23	38	59
Number of patents involved	35	52	100
Patent infringement suits filed in the Court of Claims under 28 U.S.C. 1498	10	8	9
Number of patents involved	15	21	20

Many of the above claims and suits involve more than one of the military departments, and therefore the total number of claims against the Department of Defense is less than the sum of the above figures. Each department investigates its own procurement, however, but coordinated action is usually taken on any defense available.

"Patent infringement by the Department of Defense is usually inadvertent but in some cases may be said to be deliberate. For example, while the Department of Defense is authorized by title 10, United States Code, section 2304(10) to purchase supplies by negotiation whenever it is impracticable to obtain competition, a patented item is often available from several sources including one or more sources not licensed under the patent. In such cases, formal advertising is appropriate and may result in the award of the contract to an unlicensed low bidder, especially if the low bidder agrees to indemnify the Government against patent liability or the difference in bids is more than a reasonable royalty for use of the patented invention. Under title 28, United States Code, section 1498, the patent owner's sole remedy is by suit against the Government for reasonable compensation for any such patent infringement, and he cannot obtain an injunction either against the contractor or the Government. Thus it is sometimes determined by the military departments that it is in the best interests of the Government to procure an item from an unlicensed supplier even though it is known that a patent may be infringed. Such determinations are made by contracting officers with advice from patent personnel in the Departments of the Army and the Air Force, and by the Assistant Chief of Naval Research for Patents in the Department of the Navy as described below.

"Article 1265 of the Navy Regulations (1948) provides, in effect, that no person in the Naval Establishment shall knowingly adopt or use any proprietary article,

[23] See p. 292.

invention, or copyrighted matter without consent of the owner, or authorization of the Secretary (delegated to the Assistant Chief of Naval Research for Patents) unless the exigencies of the service necessitate such adoption or use prior to such consent or authorization, in which latter case a full report shall be made. During the fiscal year 1959, 18 such authorizations involving over 62 patents were granted by the Assistant Chief of Naval Research for Patents on behalf of the Secretary of the Navy and 3 reports after award of contracts involving an additional 2 patents were made. Certain of these patents are presently being sued upon in two of the above-noted Court of Claims suits and others are involved in four of the above-noted administrative claims now pending before the Navy Department. All of the remaining patents as to which an authorization was granted are the basis of a potential claim against the Government."

For your information, neither the Department of the Air Force nor the Department of the Army have regulations exactly comparable to article 1265 of the Navy Regulation (1948) referred to in the Navy reply. For your further information, the Department of Defense policy is stated in the Armed Services Procurement Regulation in paragraph 9–107.1(b) quoted in pertinent part as follows:

"* * * to pay a reasonable compensation for the use of a valid patent enforceable against the Government, but the questions of infringement, validity, and enforceability of the patent shall be determined by personnel having cognizance of patent matters for the Department concerned."

Sincerely yours,

G. C. BANNERMAN,
Director for Procurement Policy.

Senator LONG. I want to ask one general question here. What is your impression about the practices of your contractors when they hire technicians and scientists to do research and development work for them? Do they take contracts that require their employees, the scientists and engineers to turn over all research data and all know-how, as well as all patents, to them?

Mr. FALVEY. While he is in their employ, or are you talking about what he might have conceived and developed prior? I would say, generally speaking, it is the practice——

Senator LONG. You have had considerable experience in private industry before you came to Defense, have you not, Mr. Falvey?

Mr. FALVEY. Yes; I have been a patent attorney for 22 years, Mr. Chairman. I have had quite a bit of exposure to it.

Senator LONG. With the Army? You say you were a patent attorney for 22 years?

Mr. FALVEY. In private industry, and I was dealing with the services, you might say, from the other side of the table. I was the negotiator for a corporation.

Senator LONG. Which corporation was that?

Mr. FALVEY. The Electric Auto-Lite Co.

Senator LONG. What is your experience as a patent lawyer representing a corporation in relation to its employees in your contracts? Is it usually provided that your employees would turn over all patentable information and know-how to the employer?

Mr. FALVEY. Those that were employed to invent, yes, sir; not the general run-of-mill employees. Those in the inventive area.

Senator LONG. That is right. I am referring to those who are employed to develop something.

Let me ask you how you think you would have gotten along with one of your clients, the corporation you represented or some clients you represented, if you had drawn such a contract that in the course of the research and development in your laboratories if one of the employees secures a patent, quits, and then goes out and make himself

$5 million or $10 million with a patent that does not have anything particularly to do with your business. Do you think your stockholders and your employer would have been happy about that?

Mr. FALVEY. I do not think I quite understand the first part of that factual situation. He is employed to invent?

Senator LONG. Let us consider the following situation: You were employed by a corporation that dealt with some type of electrical equipment, is that correct so far?

Mr. FALVEY. That is correct, sir.

Senator LONG. Suppose one of your employees, working in your laboratory on company time, came up with information which enabled him to take out a patent on a new product such as nylon, which would be worth a fantastically large amount of money, and the contract failed to provide that that patent would belong to that company which employed him, would you not imagine that the corporation and the stockholders would be somewhat upset about that?

Mr. FALVEY. It is a hypothetical question, Mr. Chairman, because I was never confronted with it.

I would say the individual that realizes $5 million would be a pretty fortunate fellow.

Senator LONG. Yes.

Mr. FALVEY. I do not know whether the stockholders would squawk about that or not; I do not know. It is a hypothetical question, and I was never confronted with it.

Senator LONG. My reaction is that the reason you employ a lawyer is to see to it that your interests are protected in representing your people. My thought would be that the interest of the stockholder in that corporation would not have been protected if you had left out something in that contract which made it possible for my company to lose a lot of money.

Mr. FALVEY. Perhaps, when I said——

Senator LONG. Or failure to make a lot of money—let us put it that way—where the average lawyer would have provided for such a situation.

Mr. FALVEY. The invention agreement specified all inventions conceived, developed, and so forth, while in the employ of the company. It is pretty hard to differentiate between what is directly related to the specific work he is doing, the developmental and experimental work, and something that might be somewhat apart, whether it is related or not, which is sometimes a tough question when you get into these scientific areas and technical areas.

Senator LONG. Well, what is your experience insofar as employment of subcontractors by those who work for the Department of Defense is concerned? Do they, in their agreements on research and development, require the subcontractor to turn over to the contractor any patents or know-how which he might develop?

Mr. FALVEY. I am not familiar with that.

Mr. BANNERMAN. Are we talking about the Department of Defense research and development prime contract?

Senator LONG. Yes.

Mr. BANNERMAN. The Government requires that the prime contractor, in placing subcontracts under a developmental contract, include provisions substantially similar to those that are in the prime's

contract or else get specific Government waiver if they find they cannot get a sub to agree to that.

I think in almost every instance where the subcontractors patents or invents a license right is passed on to the Government through the prime contractor in exactly the same way as the patents of the prime are passed.

Senator LONG. How about the right of the subcontractor to retain the patent for use not in the military?

Mr. BANNERMAN. Insofar as the Government is concerned, that right would be, the right for commercial usage of the patent, title to the patent, in other words, would be, retained by the sub.

Now, we, of course, do not get into what arrangements may be made between the prime and the sub, except to say that Government money will not be used to accommodate such arrangement.

Senator LONG. Well, here is what I would like for you to find out for me. My impression is this: In all probability I think you will find that some companies do permit the subcontractor to keep the patents, and some companies do not. That is my guess, and I believe you will find that to be correct.

If that is, and assuming that to be the case, I would like for you to provide this committee with the information simply as far as your largest prime contractors are concerned, and I would be satisfied to settle for the top 20, the largest 20 as to whether those companies permit their subcontractors as a general rule, to keep these patent rights. Or do they require these patent rights to be vested in the prime contractor?

Mr. BANNERMAN. Mr. Chairman, we will certainly make an effort to get that information for you. We do not have it anywhere in the Department of Defense.[33]

Senator LONG. Right.

Mr. BANNERMAN. We would have to get it from the primes.

I woud like to point this fact or, perhaps, reiterate this fact, that if they have a policy of acquiring title, if the prime has a policy of acquiring title, from the sub under those circumstances we insist that that be by a separate negotiation and not as part of the subcontract that is negotiated under our prime, under which we are assuming the cost, you see.

Senator LONG. Yes.

Mr. BANNERMAN. Our policy is to leave it with the sub insofar as we are concerned.

Senator LONG. Well, right now you do not know the answer to that question?

Mr. BANNERMAN. I think you are exactly right. The policies of primes probably vary all over the lot.

Mr. FALVEY. I believe, as the witness mentioned earlier, Mr. Chairman, that would be a matter of, you might say, private contract between the prime and the sub.

Mr. BANNERMAN. With private money.

Mr. FALVEY. Yes. But the Government would derive the rights under the sub.

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[33] See app. XV, p. 446 for information supplied.

Mr. BANNERMAN. The Government would have a license right to practice or to have anybody else practice any invention of a subcontractor under those circumstances.

Senator LONG. Yes.

We had testimony here on behalf of one large corporation, which is a substantial contractor with your Department, that it is their practice to permit the subcontractor to keep the commercial rights.

My guess is that this is not a typical situation, and I would like to know precisely what the situation is.

Mr. JOHNSON. Senator, do you mean where a Department of Defense contract is involved, or do you mean across-the-board in their own private contracts?

Senator LONG. I mean insofar as Department of Defense contracts are concerned. But if the policy is different on a private basis, I would like to know that as well.

My guess is that the policy is probably consistent.

Mr. BANNERMAN. My guess would be the other way around, Senator, but that is purely a matter of opinion.

Mr. FALVEY. We will try to get the facts for you.

Senator LONG. Our committee would like to have this information. My guess is that you can get in about 20 letters.

Mr. FALVEY. We will write them. (See Appendix XV p. 446 and XV(A) p. 453.)

Mr. ANSBERRY. Mr. Falvey, what is the annual dollar volume of R. & D. for Defense this year?

Mr. FALVEY. R. & D. only? Our total procurement—have you got it?

Mr. BANNERMAN. No. That is an available figure though within the Department, and can be made available to you.

Suppose we supply that for the record. We have that information.[34]

Mr. GORDON. Mr. Falvey, will you please identify your associates?

Mr. FALVEY. Yes. This is Mr. Bannerman, Director for Procurement Policy, Office of the Assistant Secretary of Defense, Supply and Logistics; Mr. Howard Williamson, in Mr. Bannerman's office; Mr. Johnson, of Office of General Counsel of the Department of Defense; Captain Fitch of the U.S. Navy, obviously; and Mr. Snyder, I believe, Patent Department of the Navy, am I correct?

Captain FITCH. Both of the Office of Naval Research, Patents.

Mr. GORDON. You state that the license you receive means that the Government has the right to have any manufacturer issue or produce the patented article for the Government without payment to the patent holder?

Mr. FALVEY. Yes, I believe that is what I said.

Mr. GORDON. Does it work out that way in practice?

Mr. FALVEY. You say does it?

Mr. GORDON. Does it work out that way in practice? Would you think that a company other than the developer, could have produced either a Lockheed F104 or a Titan missile? I am asking that question from a technical point of view. Doesn't it generally end up with

[34] Information subsequently furnished the committee by Mr. Bannerman: "In response to this request, we submit the figure of $5,239 million, as representing prime contract awards for research, development, test, and engineering for fiscal year 1959" (excerpt from letter dated Dec. 16, 1959, to clerk of the committee).

the developer also being the producer of your more complicated items?

Mr. FALVEY. That presents a very interesting distinction between know-how and patents. Mr. Bannerman would like to comment on that, but I did want to get that observation in there, that there is a big distinction, in my opinion, between know-how and patent rights.

Mr. BANNERMAN. Mr. Gordon, so far as the patents are concerned, what Mr. Falvey said, of course, is correct. There is no patent reason why we cannot go to anybody else.

However, when you put, perhaps, $100 million or more into a company to develop a new major weapon, probably coupled with 3 or 4 years of time that has gone into it, it is rather unlikely that you are going to find anybody else who can produce that weapon at reasonable cost and within a reasonable time for the Government thereafter.

This is a fact which the Congress has recognized in one of the negotiation exceptions which was given to us. It is exception No. 14 in the Armed Services Procurement Act which provides that you may negotiate with a single company when to do so would avoid duplication of substantial initial investment or substantial periods of time or procurement would otherwise be delayed.

Now, these are large weapons you are talking about, and what you say as to large weapons is very frequently true.

However, let us recognize that in the research field we are doing business all over the spectrum from some rather simple things to these very elaborate and complicated things, and it is very frequently true with respect to things we develop that we thereafter buy from others.

Mr. GORDON. The answer to the question then would be "Yes"; is that correct?

Mr. BANNERMAN. The answer to the question, confining it to the Titan, would probably be "Yes," simply because there is not time or money to develop additional sources.

Mr. GORDON. As I understand it, the Government takes title only when the contractor decides he does not want it; is that correct?

Mr. BANNERMAN. That is true as far as our normal day-by-day working policy is concerned. But, recognize, we have no statute that prevents us from taking title if we want to.

Mr. GORDON. I will come to that shortly.

Mr. BANNERMAN. And we do do it.

There are cases actually in our own regulations, for instance, of civil defense items where we do take title.

Mr. GORDON. I will come to the second part in a short while.

What criterion do you think the contractor uses in deciding whether or not he should take title?

Mr. FALVEY. The contractor or the contracting officer?

Mr. GORDON. Obviously whether it is profitable for him to do so, is that right?

Mr. FALVEY. My question was, Are you talking about the contractor or the contracting officer?

Mr. GORDON. I am talking about the contractor.

As I understand it, the usual policy is that if the contractor does not want title, you take it; isn't that right?

Mr. BANNERMAN. If the contractor does not wish to spend enough money to file a patent application and prosecute his patent, we are able to do so if we so elect.

Mr. GORDON. All right.

Mr. BANNERMAN. He must transfer his rights to us under those circumstances.

Mr. GORDON. Now, generally, when a contractor decides that he does not want title, that he does not want the patent rights, what kind of a criterion do you think he uses? Would you think he uses the profitability criterion? Would it be fair to say that he will not take title if he feels that it is not profitable for him to do so?

Mr. FALVEY. That is a logical assumption.

Mr. GORDON. Isn't that a logical assumption?

Mr. FALVEY. Yes. All right.

Mr. GORDON. This is, in a way, perhaps, a personal question. Would you be against the Government taking title on principle?

Mr. FALVEY. Do you mean in the Department of Defense practice?

Mr. GORDON. Well, would you be against the U.S. Government taking title on principle? Do you think it is a bad idea?

Mr. FALVEY. That is a pretty strong word, "bad" idea.

I think I can answer your question by saying that I think it would expedite the program of the Department of Defense to follow the license theory rather than the title theory on the grounds that there are contractors with whom we want to deal that might not be interested in dealing with us on the other basis, on the title basis. Do you follow me?

Mr. GORDON. I am just asking whether you are against taking title on principle; that is, do you think it is a bad idea for the Government to take title under any conditions?

Mr. FALVEY. I do not like the use of the words "bad idea."

Mr. GORDON. Well, would you be against taking title even under the conditions where a contractor does not want the title?

Mr. FALVEY. I am afraid I do not understand that question.

Mr. GORDON. Suppose the contractor is not interested in taking title? He feels it is not profitable for him. Do you think the Government should take title under such conditions?

Mr. FALVEY. It all depends on what the invention is.

Mr. BANNERMAN. It is quite likely that the Government should, Mr. Gordon, because the Government, if it intends to practice that invention in military equipment, must protect itself from having somebody else patent it.

Mr. GORDON. Well, we have had submitted to us, and it is now in the committee room, a tremendous list of titles [35] which were taken by the Government which were refused by the contractor. The Government, for some reason or other, decided that it wanted to take title to these developments.

Mr. FALVEY. Yes; I believe we have.

Mr. GORDON. You supplied the material to me, Mr. Williamson, as you will recall.

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[35] Retained in committee files.

Mr. WILLIAMSON. Mr. Gordon, I think the answer to that question is where we acquired the title it was because the contractor had decided he did not wish to prosecute.

Mr. GORDON. He did not wish to do it. I see.

Mr. WILLIAMSON. And for defensive reasons or whatever reasons motivated us at the time we elected to prosecute the invention after the assignment of all of the contractor's right, title, and interest to the Department to do so.

Mr. BANNERMAN. And the motives may be quite different, Mr. Gordon. As you say, it is quite possible that the contractor would conclude there is no commercial future in this invention and, hence, it is not worth his time.

The Government, on the other hand, with respect to the same invention might conclude that this invention is inherent in some military equipment that the Government will want to buy, and it does not want somebody else prosecuting that patent and keeping the Government out.

Mr. GORDON. In that case then, shouldn't that consideration also enter into the giving of the title, whether the contractor finds it profitable to take it or not?

Mr. BANNERMAN. No; because the Government, by taking a license to a patent that is prosecuted by the contractor, gets all of the protection and all of the rights that the Government has any need for, but they would not even get that if he did not prosecute his patent.

Mr. FALVEY. I think what Mr. Bannerman is saying is that the patent then becomes a matter of record, do you follow me, Mr. Chairman?

If the contractor elects not to file, notifies the Government that he elects not to file, then the Government, in the exercise of its judgment and discretion, decides it would be desirable to file, and it makes the patent a matter of record; it is what might be termed a defensive approach.

Mr. BANNERMAN. It is a way of protecting the license that we need.

Mr. GORDON. Do you have that same protection if the contractor takes the title, too?

Mr. FALVEY. We have a license.

Mr. GORDON. Only a license?

Mr. FALVEY. We can build or have anybody else build for us, and for us I mean the Government, the United States Government, not just the Department of Defense.

Senator LONG. Let me see if I understand this. Do I understand you to be saying that in many instances you take a patent when the developer is not interested in taking it, and one reason you do that is because you do not want someone else to take a patent out on the same thing, thus possibly hindering or impeding your progress because you would have no rights in the patent if someone else took it out?

Mr. FALVEY. That is, in substance, correct, Mr. Chairman.

However, I do think that statement and the statements that have been made here are subject to qualification.

When we talk about somebody else obtaining a patent, bear in mind that under our patent statutes the original and first inventor is the

one that is entitled to a patent. There is a little confusion there about somebody else getting the patent.

Senator LONG. While I am on the subject though, you have a background as a patent lawyer, so you would know the answer to that better than I would. Is it true that the majority of these patents won't stand a determined test in court?

Mr. FALVEY. I am afraid that is correct, Mr. Chairman.

Senator LONG. My impression was that the great majority of patents do not have patentable novelty. If you consider a given problem there is generally only one logical way you can solve it, and that is what most people will do under most circumstances. The person who applies for a patent does not prove he was the first one to think of the idea, and my impression has been that most patents would not stand a determined court test by a good lawyer. I take it that is your impression also?

Mr. FALVEY. You are very correct there, Mr. Chairman.

If they survive the District Court then they have a slimmer chance in the Court of Appeals, and if they happen to get past the Court of Appeals, they usually catch it in the Supreme Court.

Senator LONG. What is your guess as to the percentage of patents that could actually stand a determined test all the way up to the Supreme Court?

Mr. FALVEY. I would not want to give it in terms of percentage, but it is awfully thin.

Senator LONG. Very small?

Mr. FALVEY. Yes, sir.

Captain FITCH. As a matter of interest, the statistics show that about one-half, 60 percent, of patents tested in court are held invalid. But, of course, those tested in court are the ones where some lawyer thought he could knock it out.

Senator LONG. Yes.

Captain FITCH. So it may be that those not tested in court would have a better chance if they were tested. But of those tested in court——

Senator LONG. It would seem to me it would be just exactly the other way around; in other words, my guess is that out of patents that have been applied for and issued, that there are probably more of them that are not tested in court because the lawyer for the person who had the patent probably informed him, to begin with, that he did not think it would stand up.

Captain FITCH. Well, the number of licenses would not support that theory, Mr. Chairman.

Senator LONG. What is that?

Captain FITCH. The number of patents which are licensed would not support your theory. In other words, if a patent is questionable but of great value, a company may buy a license for a small fee rather than risk the tremendous cost of litigation with the chance of losing.

Senator LONG. Well, the statement of Mr. Falvey, Captain Fitch, was just exactly the opposite of yours. His guess is that only a very small percentage of patents are valid.

My impression was, from what little experience I had with the subject, that it was an extremely small percentage, and I have been

told by businessmen that out of a big stack of patents that they have, they would be surprised if any more than two of them were valid.

Mr. FALVEY. I would just like to make one observation, Mr. Chairman. I believe your question and my answer were directed to the patents that were litigated. I did not touch on the patents that Captain Fitch is mentioning that do not get into litigation.

Senator LONG. Yes.

Mr. FALVEY. You appreciate the distinction.

Senator LONG. Yes.

Mr. FALVEY. I might mention, too, as a matter of general interest, in addition to this——

Senator LONG. What is your guess about those not litigated? Is it your guess that most of them would stand up or not stand up?

Mr. FALVEY. That all depends on which side of the case you are on, Mr. Chairman.

There is also a question besides this matter of novelty which is one of the reasons why so many patents are thrown out, another question that is often raised is noninfringement. The court sometimes will hold a patent valid but not infringed.

Senator LONG. Yes.

Mr. GORDON. Mr. Falvey, if I may continue, you stated that allowing a contractor to take title, and your taking a license gives you sufficient protection; is that correct?

Mr. FALVEY. That is correct.

Mr. GORDON. I want to submit for your consideration the following thought: That actually it does not give you the rights and the protection that you think you are getting.

Mr. FALVEY. That is interesting.

Mr. GORDON. If I may continue, patent ownership could be defeated through a patent interference where the rights may be decided ex parte by the parties to the interference. Let us suppose that this contractor——

Mr. FALVEY. Yes.

Mr. GORDON (continuing). Develops something for you. He takes the title. He applies for a patent. Another person comes along, another company, and says: "Look, we developed this before you." Patent interference proceedings are initiated——

Mr. FALVEY. That is not started by the applicant for the patent. An interference is declared by the U.S. Patent Office to determine priority.

Mr. GORDON. All right. But somebody has to come to the U.S. Patent Office and say: "Look, we developed this either at the same time or even before."

Mr. FALVEY. Yes.

Mr. GORDON. All right. Then these two fellows get together and decide which one's was the first.

Mr. FALVEY. You mean collusively?

Mr. GORDON. Well, it could be collusively or it could well be that the other fellow was the first inventor. It could be collusively, too, and they decide between themselves, with you out of it completely, that the other fellow was the inventor and should get the patent. In that case he does not have to grant you a royalty-free license. You are stuck, and you cannot use it.

Mr. FALVEY. We have got the license, but we have got no patent.

Mr. GORDON. But you cannot get a royalty-free non-exclusive license because the person who contracted to give it to you could not have gotten the patent in the first place.

Mr. FALVEY. All right. The second fellow in your instance, isn't that the one we had relations with? Do you follow me?

Mr. GORDON. That is right. But he gets the patent because it has been decided——

Mr. FALVEY. By the Patent Office.

Mr. GORDON. Pardon me?

Mr. FALVEY. By the Patent Office; isn't that right? They award priority of invention to him rather than to me.

Senator LONG. You would have a license to an invalid patent in that case.

Mr. FALVEY. We have a license to no patent.

Mr. GORDON. Could you say, then, that is a possibility under your present system? If you yourself took title right off the bat, would you say then, that this kind of a situation would be less likely?

Mr. JOHNSON. The same thing would be true if we claimed title in the first instance.

Captain FITCH. We have interferences in the Patent Office right now where somebody claims they invented this first, and we claim we were the inventor and hold the title. The Patent Office resolves that against the Government as often as it will resolve it against the individual.

Mr. GORDON. Suppose you had a law by which the Department of Defense takes title, that is anything that is developed with the Department of Defense's funds, become Government property and all rights are vested in the Government, what happens then if someone says: "Look, I developed this some time ago"?

Mr. FALVEY. Are you talking about an interference——

Mr. GORDON. Yes.

Mr. FALVEY. (continuing). A formal interference proceeding in the U.S. Patent Office? The purpose of that proceeding is to determine priority of invention. It is a rather long, involved procedure, I am sure you know, and it involves priority of conception, reduction to practice, and so forth. But I do not think it would make any difference who held title in an interference proceeding. It is a question of first to conceive and first to reduce to practice.

Mr. GORDON. But here is the point: if you are a party to this, you could say, "Look, all right, we will let you have the patent, but you give us the license."

Mr. FALVEY. "We" in that sentence is the Department of Defense?

Mr. GORDON. Department of Defense.

Mr. FALVEY. Yes.

Mr. GORDON. But if the rights have been given to somebody else, this could be done completely without you, in fact it could be done collusively, you could say.

Mr. FALVEY. Well, if it is done collusively I think that could be dealt with separately.

Mr. GORDON. Suppose it isn't done collusively.

Mr. FALVEY. All right. If it is not done collusively it is on the merits. If it is on the merits we do not gain or lose. If it is done collusively there could be another approach.

Mr. GORDON. Aren't you in a better bargaining position, when you two are bargaining together? At least you can say: "All right, we will give you the patent, give us the nonexclusive license."

But when you do not have any rights at all, you are completely out of it, the decision is made between those two contractors.

Mr. FALVEY. I still come back to that distinction there, either it is done on the merits or it is not done on the merits.

If it is not done on the merits it is collusive, and there are laws dealing with collusive action.

As I see it, our position is no different whether we hold title to the patent or whether we got a license. If it is decided on the merits we get what we are entitled to. If it is done collusively, why, we can go after it with a different approach.

Mr. BANNERMAN. Mr. Gordon, I am not a patent lawyer, and I do not know too much about these things, but it is my understanding if there came an interference action between two parties under the circumstances you mentioned, that would be fought out in an antagonistic action before the Patent Office, and not between the two parties theselves as a side issue.

Mr. FALVEY. Incidentally, you mentioned ex parte in connection with an interference. I do not believe an interference proceeding is ex parte. I believe that is an adversary proceeding.

Senator LONG. Mr. Falvey, while we are talking about patent law, I think this would be as good a time as any for me to submit this question to you: Who is qualified in this field? Let us take a case where a person applies for a patent in this country——

Mr. FALVEY. Yes, sir.

Senator LONG (continuing). But it is subsequently discovered that in England, for example, someone had the idea previously.

Would his patent be valid?

Mr. FALVEY. That is going to take a rather long answer, Mr. Chairman.

Senator LONG. Let us just simplify it a little bit more then.

This can, perhaps, be answered yes or no. Suppose it is discovered that not only had the idea been previously conceived in England but the thing had already been developed over there.

Mr. FALVEY. Or published; public use or publication.

Senator LONG. Let us say for the use of their Government.

Mr. FALVEY. I believe under the patent laws, Mr. Chairman, that that would be what is known as a statutory bar to the issuance of a patent in the United States, regardless of who applied for the patent.

Senator LONG. Yes. But suppose that was developed by the British military, and the American Patent Office did not know that.

When it subsequently became known that the British military people in their armed services in a secret manner had developed this item, would the American patent then any longer be valid?

Mr. FALVEY. Well, let me answer it this way: Under the circumstances as you outline them, it is my understanding that the applicant for the patent in the United States was not, in fact, the first inventor.

Senator LONG. That would be correct.

Mr. FALVEY. Yes. Then I would say if the patent issued and an infringement action were brought on that patent, the defendant could cite that British activity to invalidate the U.S. patent.

Senator LONG. I would be curious to know if that is the judgment of Mr. Johnson over here. Is that your guess, sir?

Mr. JOHNSON. If the British proceedings were in secret that would not be a cause for invalidation of the American patent.

Senator LONG. You say, in other words, if England developed this item secretly——

Mr. JOHNSON. There would be no——

Senator LONG (continuing). It would be part of their security program.

For example, let us take a jet airplane which, as I understand, England did have ahead of us. Suppose England had this jet airplane which they were testing over there during World War II. Then an American comes along and develops a jet airplane subsequently. Would the American have a valid patent by virtue of the fact that England developed this plane secretly?

Mr. JOHNSON. If it was impossible to discover, from any information available to the public, the nature of the invention patented—the fact that England had developed the idea in England secretly, would not be cause for invalidating the American patent.

Captain FITCH. Mr. Chairman, the test is the first American inventor, as long as he invented it.

If he learned about it in England, he is not an inventor under our law. He must be the one who invented it here.

Senator LONG. Yes. But the point I have in mind, and this I want to get straight, is, does an American inventor hold a valid patent when he had invented something that has been previously invented, although he invented it independently of the foreign source?

Captain FITCH. Yes, sir.

Mr. JOHNSON. Yes, he does, so long as the foreign development was secret.

Captain FITCH. Section 102 of the statute, Mr. Chairman, says that in case of an invention in a foreign country it must have been patented or published in order to be a statutory bar here. If it was known or used in the United States, it is a bar to the U.S. inventor.

But it might be known and used in a foreign country, but still not be a bar to the American inventor who does not even know about this foreign use.

Senator LONG. Is that your impression now, Mr. Falvey?

Mr. FALVEY. It may be that I might have been a little bit off base there in connection with the foreign publication, use, and so forth. But may I ask a question, Mr. Chairman?

Senator LONG. Yes.

Mr. FALVEY. Supposing that that were, that foreign activity, publication or whatnot, supposing that were a bar to the patenting in the United States. That would not prejudice our position, would it?

Senator LONG. I was only getting to this point of the validity of a number of these patents.

One of the reasons I touch on this is the fact that in regard to our outer space program and our missile program, the testimony before our committees has been that the Russians are very far ahead of us. We do not know just what they have got. They would not be ahead of us if we knew how they were doing it, but I think Mr. Von Braun testified before one of the committees up here that he thought they

were 3, or perhaps, even 5 years ahead of us right now in this missile business.

If that would be true then I would assume that our patents over here in the missile field and the rocket field would be valid for the most part, only by virtue of the fact that the Russians keep it secret from us.

Mr. FALVEY. I think, Mr. Chairman, if I may make an observation, in the Department of Defense we are much more interested in the effectiveness, reliability and performance of our weapons than we are in our patents. They are kind of a secondary consideration; at least that is the view I take.

Senator LONG. Yes, I agree with that, too. But if people are going to pay for patents, and if we are going to pay very big prices for them, and if the public is going to pay for the use of these patents, it would be desirable to know if these patents are valid under the law. That is why I was curious to know whether the fact that the Russians may have developed something first that we do not have, whether the American who invents the same things that the Russians have already invented has a valid American patent on it.

Mr. FALVEY. Well, there apparently is a little shade of difference here between myself and these other experts. Maybe I am not as up to date on my patent law as I might be.

Senator LONG. If there is a difference of opinion, let us try to put it on the record. Here is what I want to know:

Assuming that the Russians have previously invented in their missile program many of the same things that we are presently inventing, is the American patent valid by virtue of the fact that we do not know what they invented over there?

Captain FITCH. Yes, sir.

Mr. JOHNSON. Yes, sir.

Captain FITCH. Perfectly valid. That happens all the time.

Senator LONG. Would that be your guess on it, Mr. Falvey?

Mr. FALVEY. I will defer to these men on that question, Mr. Chairman.

Senator LONG. Is that your view, Mr. Johnson?

Mr. JOHNSON. Perfectly valid.

Senator LONG. In other words, the fact that it has not been published here and not known here makes the American the first American inventor, and the fact that the knowledge is not generally known outside Russia would mean that this patent would be valid in America?

Mr. JOHNSON. In this, if it is secret in Russia, and an American invents an identical object in the United States, his patent in America would be valid.

Mr. FALVEY. It looks as though I am somewhat overruled by my associates.

Senator LONG. There is one other problem that occurs to me. How about the situation where Britain develops something secretly, takes patent to it. She does have an agreement with us for the international recognition of patents, does she not?

Captain FITCH. Yes, sir.

Senator LONG. Where do we stand in this country with regard to an item which Britain has patented, and on which an American also has a valid patent?

Captain FITCH. What do you mean, "Where do we stand?" Mr. Chairman? We have a valid patent, and so can they in England, sir.

Senator LONG. Don't we have an agreement with them that we will pay royalties on their patents?

Captain FITCH. No, sir. We exchange, where the United States and the United Kingdom own or have licenses, we exchange patent rights.

Senator LONG. Is that correct then? This Government then owns any patent rights that would exist on something developed in England; is that correct?

Captain FITCH. As long as the United Kingdom Government owns or has a right to use, yes.

Senator LONG. Suppose it is an Englishman who has it, an English firm?

Captain FITCH. The English Government would probably have to pay on that, and we would, too, sir, if it is a privately owned patent.

Senator LONG. Would we have to pay both inventors, both theirs and ours?

Captain FITCH. Oh, no, sir; not for use here; and, further, we have a provision that if we employ the United States invention in a ship or aircraft in England we do not infringe the English patent.

Mr. FALVEY. Mr. Chairman, for instance a U.S. patent is the only thing, under ordinary circumstances, unless there is something most unusual, only a U.S. patent would have any effect in the United States. A British patent would not be anything to deter me or you from producing anything in the United States that went smack into it. It would have no extraterritorial effect.

Senator LONG. Do I understand that problem only exists when our part goes to England?

Captain FITCH. Yes, sir. When you go into the territory of the country where they have a patent, that is when you get the problem of possible infringement, and that is why our British-United States bilateral interchange of patent rights agreement, we can go to England and use their patented article without paying a royalty, and they can come here and do the same.

Senator LONG. So then am I correct, is the practical effect that any time something has been invented in England, we can use it over here without paying a patent or license fee or do we owe a fee to the English inventor to use in this country?

Captain FITCH. No. sir; not a thing. The only time the English inventor can have a claim against us here would be to have a U.S. patent.

Senator LONG. He could come in and apply for one here?

Captain FITCH. Yes, sir.

Mr. FALVEY. Yes, sir; and, by the same token, a U.S. inventor can apply for patents in any country in the world which has a patent system.

Senator LONG. That makes it quite clear to me.

I would like to ask you if our patent system does not in some respects encourage a firm to keep unto itself information which would lead to patents, at least until that firm can actually make the patent application and develop its device?

Mr. FALVEY. In commercial practice, Mr. Chairman?

Senator LONG. Yes.

Mr. FALVEY. I have known of instances where, let us say, on a machine patent as distinguished from an article patent—do you follow me?

Senator LONG. Yes.

Mr. FALVEY. A machine for accomplishing something, a process in a manufacturing establishment, some concerns say there is no point in applying for a patent on it because they would just tell all their competitors how to build this machine, so they do not bother to patent it, because a patent is open to the world. You do not have to do anything, but just go in there and pay a quarter and pull out the patent and look at it.

Senator LONG. Have you also known of instances where a company is developing something and keeping as a trade secret technical data, until they were in position to develop their product and patent it in order to protect themselves?

Mr. FALVEY. I think there are instances of that, Mr. Chairman, on the theory or because of the fact that there is often quite a delay from the time of filing a patent application to the full grant or issuance of the patent by the U.S. Patent Office. It might be 2 years—I guess there was one case where a patent has been tied up in the office for something like 22 years.

Senator LONG. Yes.

It seems to me that when inventors discover a solution to a particular problem, they would try to guard that information very zealously until they had developed their device to the point where they were in a position to apply for a patent. If they did not do that someone else would try to develop it and get a patent on it. Failure to keep the information to themselves would result in someone else being able to take that information, beat them to it, and get a patent on it first.

Mr. BANNERMAN. Mr. Chairman, there are many trade secrets in industry that are never patented, but they are kept secret.

Senator LONG. Yes, because it gives a corporation a competitive advantage over another one.

Mr. BANNERMAN. That is correct.

Senator LONG. With regard to both the trade secrets which a corporation may have, and information that may lead toward the development of products, does not the keeping of that information to one's self tend to delay the day when the product would be developed?

Mr. FALVEY. Was that addressed to me, sir?

Mr. BANNERMAN. That is making your trade secret not very valuable. Trade secrets are useful only as they are used.

Senator LONG. I would like to have a direct answer to that question. Does not the keeping to one's self of trade secrets and of information which could lead to patents tend to delay the development of a product?

Mr. FALVEY. I want to make sure I understand the question before I attempt to answer it. That is, the withholding of trade secrets tend to defer the introduction of the product?

Senator LONG. Delay the introduction of the product.

Mr. FALVEY. I think that follows naturally.

Senator LONG. Pardon me?

Mr. FALVEY. I think it follows as a logical consequence of withholding or sequestering or whatever you want to call it, the trade secret.

Senator LONG. It seems to me the answer is self-evident. It has to be "Yes."

Mr. FALVEY. That is what I am saying or what I am trying to say.

Senator LONG. A previous general manager of the Atomic Energy Commission who was once a very good corporation executive, explained the secrecy problem to me in this fashion. He said: "The more minds that you let work on a problem the quicker you are going to find the answer." Would you say that that is correct?

Mr. FALVEY. That is a pretty broad question. In some situations, yes. The more talent you apply to a problem, probably the sooner you will come up with a solution, and the more effective the solution will be.

On the other hand, you can encounter the situation where you have too many cooks spoiling the broth, and nobody gets anything done. Do you follow me?

Senator LONG. Yes. But assuming that no one man is getting in the other man's way, the more people who put their minds to work on a problem, the more likely you are to find an answer to it.

Mr. FALVEY. Assuming they are capable people, and you put a task force in there as distinguished from one or two men, I think it is obvious that you will come up with the answer sooner, the solution to the problem sooner, when you have got more talent working on the problem.

Senator LONG. That is the point that a very able corporation executive, who was at that time in the Government, made to me in discussing the secrecy problem. As a member of the Atomic Energy Commission, he did not feel that they should keep anything secret that does not absolutely have to be kept secret, because when you are trying to find answers to problems you are going to find them quicker if you let more scientists and more engineers know about them.

Some fellow not even on your payroll might be the fellow who might find the answer for you. Does that make good sense to you?

Mr. FALVEY. I do not think I would go that far. I understood your previous question to mean a task force assigned to the solution of a problem. That would be putting a staff on the problem to come up with a solution rather than just one or two people.

Senator LONG. Well, let us consider an extreme case. Suppose it were generally known to all scientists and engineers in this country what our greatest single technical problem was in mastering this outer space missile. Any scientist could think about it, in addition to those who were employed to work on it. Would it seem to you that there would be a stronger possibility, that we would find the answer quicker, than we would by having a limited number of people know what the problem is, as well as knowing what the different proposed methods of trying to find the answers were?

Mr. FALVEY. Are you suggesting, perhaps, that necessity is the mother of invention?

Senator LONG. What I am saying is a very simple thing. It is just as simple as saying that two heads are better than one when it comes to trying to find an answer.

Mr. FALVEY. If they are two good heads; yes, sir.

Senator LONG. It seems to me that to a considerable degree, our trade secrets, together with the withholding of information which

could lead to patents, tend to delay in many instances—probably most instances—the development of a new commodity.

I am not talking about the incentive part of it. I am just talking about the technical part of it.

Captain FITCH. Of course, Mr. Chairman, the inventor has the incentive of making a patent application because he who applies last is at a terrific disadvantage in comparison to one who applies first.

So this is also sometimes a race to get to the Patent Office, so he has a real incentive to get there.

Senator LONG. But once a person thinks he has an idea about how something can be achieved, the fact that he is keeping that to himself means that it will probably be achieved at a later date than it would if he made the idea generally known.

Mr. FALVEY. I do not think there is any question about that, Mr. Chairman.

Senator LONG. That is my thought on it.

What I am getting to in this respect is just this fact: I am curious to know whether among those working on the development of products, on our Government contracts, the technical and scientific knowledge that these different contractors are developing becomes known to the others.

Mr. FALVEY. My belief is—I believe Mr. Bannerman commented on that, and if it is satisfactory with you, I would like to refer it to him.

Mr. BANNERMAN. Well, just repeating the comment, Mr. Chairman, the Government supervises rather closely all of these major developments that are going on.

The Government knows or is in position to know certainly what steps are being taken, what procedures are being evolved, and what data they are coming up with.

The Government can, and very frequently thereafter does, make this data, this information, available to other contractors who have comparable problems working for the Government. It goes on right along. It is a matter of Government administration of the data.

Senator LONG. You try to make that available as rapidly as you can?

Mr. BANNERMAN. We would be stupid to pay twice for the same development.

Senator LONG. How do you overcome the selfish motive of an individual that by keeping a trade secret or an idea to himself he may be able to get the patent on it?

Mr. BANNERMAN. One answer to that one, Mr. Chairman, is simply this: That our policy of taking a license rather than a patent right encourages him to go ahead, because he retains the commercial value, whatever it may be, and gives us only that which we need, so that it would not be the incentive to hold the thing to himself.

Senator LONG. That is when he has the patent; but I am talking about the situation prior to the time he has the patent. He comes up with the idea that this might do it, this just might work.

Mr. BANNERMAN. But if he tells us he has not given anything away, he has not given his commercial rights away because we are not going to take them in any event.

Senator LONG. Yes. Let us assume that a number of corporations would like to have this knowledge, and would like to know it for their own commercial advantage.

Now, the moment that his competitor finds it out, his competitor just might beat him to developing it. The point I have in mind is how do you overcome the fact that it is to his advantage commercially and economically to keep this to himself until he has actually had a chance to develop this thing far enough to patent it?

Mr. FALVEY. May I make an observation on that, Mr. Chairman?

Senator LONG. How do you overcome that is what I want to know.

Mr. FALVEY. I assume in that state of facts we have a scientist or engineer in the employ of a contractor, a Government contractor, is that the situation? Do I understand that fact?

Senator LONG. Yes.

Mr. FALVEY. The contractor is interested——

Senator LONG. I am thinking about the contractor himself. In other words, here is an idea, and there is no protection for the idea.

Mr. FALVEY. That is right.

Senator LONG. The moment you tell it it is gone.

Mr. FALVEY. That is right.

Senator LONG. So the man has got the idea, and the idea is logical, and the probabilities are that it will work—how do you overcome the fact that it is to the commercial and financial advantage of the contractor to keep this idea secret until he has gotten it far enough advanced so that he can patent it, that is, patent the product that develops, from the idea.

Mr. FALVEY. Well, he could, the inventor could go ahead and file for a patent on it the day the idea popped into his head.

Senator LONG. It is my impression, and I think this is right, that you cannot file a patent on an idea.

Mr. FALVEY. Not an idea.

Senator LONG. You have to reduce that idea to something concrete; is that correct? It has got to be reduced to some device or it has got to be reduced to a drawing of a device that could be produced. It cannot be just an idea.

Mr. FALVEY. Not necessarily a drawing. For instance, there are chemical patents that do not have drawings.

Senator LONG. It is a description of a product?

Mr. FALVEY. That is right.

Senator LONG. Either a drawing or writing.

I think that the Captain here wanted to comment on it.

Captain FITCH. I think, Mr. Chairman, what you were getting to, if a company doing one of our contracts, doing research work, comes up with an idea, now, if it is in one of their engineer's mind, and he tells noobdy, of course no one else would ever know it. But if it gets known in that research team for a big company, we have our own supervisors, all the military departments who are in there watching the work of this company. We get periodical reports from them, progress reports.

Our technical people in the Navy, and our bureaus are aware of everything they are doing, and the minute that they come up with an idea that is new and different, this goes around like a fire alarm if it is really good. So that they would have a difficult time hiding from us the developments that are coming up.

Senator LONG. How does it get from one contractor to the other? Do your inspectors undertake to transmit this idea quickly to the other fellow?

Captain FITCH. It comes back in the Navy to the bureau which, the technical bureau which, supervises that contract, and by exchange of information of those technical people, one program to another, they can then pass it back to where they think it is best needed.

Senator LONG. There is another problem that occurs to me. A by-product of our research and development contracts will be a vast amount of commercially usable patents which, you say, the Department of Defense does not need. But the consumers of this country who are paying the taxes which are supporting this Government, are also taxpayers. What I am curious to know is, Why should not the Government, when it pays to develop an invention, protect the consumer who paid for it, from paying for it a second time?

Mr. FALVEY. I believe that is an interesting question, Mr. Chairman. Mr. Bannerman would like to answer that.

Mr. BANNERMAN. Mr. Chairman, that gets down to simple economics, I think.

The fact of the matter is in our contracting over the wide area of research and development, we do not pay for title.

If we were to have as a policy the taking of title under our research and development contracts, I think, as Mr. Falvey has already said, there would be many contractors, under many circumstances, who would not do business with us on any such basis as that.

There would be other circumstances where we would have to pay more money to buy the additional thing; namely, title.

So that if we are going to adopt that policy, we are going to pay the additional. If we do not adopt that policy and do not pay the additional, then obviously the consumer—we have not bought anything that the consumer is entitled to. There is not any duplication.

Senator LONG. It seems to me that considering the development of all these new airplanes and missiles and all the equipment that goes into them and is related to them—considering the fantastic amount of research required—my guess is that your Department spent $6 billion a year for research and development. Would that be a reasonable figure?

Mr. BANNERMAN. I think if you add in all of the development work that goes on in conjunction with all our production contracts you would probably get to a figure not too far from that.

Senator LONG. After paying for all this development and helping somebody to develop new products and find patentable information, we are providing tremendous pay, and a tremendous dollar incentive.

What I have heard about health research is that the only way you can lose your money on it is to spend it in small amounts, because if you spend it in large amounts you may not find what you are looking for, but you will find something else that may be even more valuable.

It would seem to me as though the same thing would be true to a considerable extent with this money. I just cannot see why, in spending it, you should not pay a little bit extra, if need be. But I seriously doubt that you would pay anything extra to get these patent rights, so that the public, as a whole would, and could, enjoy the fruits of Government-financed research without paying for them a second time as consumers.

Mr. BANNERMAN. Mr. Chairman, in our work we do business, research and development business, with practically all of the significant research and development laboratories that exist in industry.

These laboratories in manufacturing establishments are in business to create products for that manufacturing establishment. They have no other initial reason for existence. They are not for hire to the competitors of those people.

They are not in research for research sake; they are in business to create products, to get a production line payoff, to create or improve products, to get something that can be sold on the market.

Now, we move in on such companies as those, and ask them to devote a certain amount of their research talent and time and, presumably, their best people, to the work that we want done.

We are asking them to do something that they do not normally do. We take from them everything that we need to get on with our work. We do not buy those things that may be useful to them in their commercial work.

If we do not leave any possibility of a production line payoff for the work they do, there is certainly—I do not want to overstate it—but there are certainly a number of these companies which are going to say, "We are simply not interested in that kind of business." They have told us so.

There are others who will say, "All right, if you are going to take away from us one of our principal incentives for doing this work, you are going to have to pay more for it," and we pay more for it.

There are undoubtedly others who, as you pointed out, would be compelled, perhaps through sheer economic necessity, to take our work on any basis that we want to put it up to them.

Senator LONG. Now, let me just ask you this question: If you have a company that is doing a hundred percent business with the Government—let us take one like the Aerojet-General Corp. which we heard the other day, which does 100 percent of its business with the Government, and which has increased in value 40,000 times in the last 17 years. Do you think there is any doubt whatever that if you insisted that the Government would have the patent rights on a thing that they developed under contracts with you, they would take that contract?

Mr. BANNERMAN. Well, I do not think there is much question but what in a company that is 100-percent governmental that we have got the bargaining power to insist upon almost any policy we want to impose upon them. But we have felt that we should not use this bargaining power to treat a company of that sort differently than we do generally.

Senator LONG. Do you really think it would be unreasonable and unfair to ask for those rights for the benefit of the public, in general, if these people have made on a $7,500 investment, $300 million?

Mr. BANNERMAN. Well, it is a question of whether we have any need for it or not, Mr. Chairman.

Senator LONG. You see, you are saying "we" and you are speaking only for the Department of Defense. But you are also a Government employee; you are being paid by the taxpayers, in general, as part of the U.S. Government. The American public, the 170 million people

who are paying all of this—I am one of the taxpayers, and so are you—should not be required to pay two fees, one, a fee for the expenditures of the Department of Defense, and then a second fee in the form of higher prices for that which was developed on their money, and which they paid for to begin with.

Mr. BANNERMAN. Let us talk about Aerojet-General for a minute since they seem to be the example.

Our policy has not changed any even before there was a Department of Defense; back in the days when the individual military departments had the same policy during the last war.

Aerojet-General has been doing business almost exclusively with the Government all that time, and you say, and I think it is correct as far as I know, that they are still doing 100 percent of their business with the U.S. Government.

Senator LONG. 99 percent last year.

Mr. BANNERMAN. I would say that so far the commercial value of their patents does not apparently—has not apparently paid off very much. There just have not been any.

Senator LONG. Even so, somewhere down the line it might be very valuable.

Mr. BANNERMAN. It is always conceivable; it is conjectural.

Senator LONG. What is that?

Mr. BANNERMAN. I say it is conjectural as to how it is likely to come out. You never know when you make the contract.

Senator LONG. But it would stand to reason if you look at all of them that these patent rights would be very valuable, otherwise why would they insist on them?

Take a company like Lockheed, with $400 million a year in research—$400 million a year with Government business.

Mr. BANNERMAN. Much of that is production business rather than research and development.

Senator LONG. And on which they are making a sure profit, I believe. Aren't they operating, for the most part, on a cost-plus-fixed-fee?

Mr. BANNERMAN. Are you talking now about Lockheed?

Senator LONG. Yes.

Mr. BANNERMAN. I think the bulk of their production business is not cost-plus-fixed-fee; their research and development business would be almost exclusively that. However, I think it is safe to say we would all agree they have not been losing money.

Senator LONG. And they know enough about their business so that they should be able to make a profit on what they are producing. With 45 percent of their business being with the Government, and having a very large research and development program which, according to some of their public declarations in the press is fundamental to the success and profitable position of their company, would it not stand to reason that if you just asked them at the time when they were trying to get these contracts: "Well, now, in competing with others, would you be willing to let the Government have the patent rights?", And the odds are that almost all of them would let you have it in order to get the contract.

Mr. BANNERMAN. Well, when you start talking about Lockheed you are getting over at least into a more questionable area. You are now

talking about a company that does a substantial amount of commercial business.

There are many others with whom we have very large research and development contracts who do very much larger commercial business, and I think the question of how we place our contracts with those companies is, in part at least, a question of what types of incentives do you want to provide.

Suppose, for instance, we did have across the board policy of taking title to patents. We certainly do not recommend it. I think you would be in the position of having a company doing a substantial amount of commercial business with an incentive not to devote their best ideas to Government work or even their best talent.

They would devote their best talents presumably to those places where they are likely to produce the best payoff, and in most cases it would be that work which is ultimately going to hit their production lines.

If we take title to patents, to the commercial use of the patents, they are, at least, losing one possibility of a production line payoff, and I think if they have good ideas, which is the reason we select them in the first place, there would be some question as to the extent to which these good ideas would be devoted to our work. I think there is no question but what such a policy would tend to degrade, would provide incentives for degrading, the quality of military developmental work.

Senator LONG. I have heard this statement made several times. One of the witnesses who made it yesterday, I believe, was Mr. Johnson who was advocating a policy along the lines you describe. Not only did he say it but also witnesses on behalf of some of the larger corporations.

They said that big businesses do not require patents, and do not necessarily need them. They said that big businesses have such economic strength, and they have so much know-how that they are going to get ahead and sell their products, even if they do not have any patents.

Mr. BANNERMAN. They certainly are not hurt any by having the patent.

Senator LONG. Mr. Johnson of NASA told me the same thing after the hearing was over yesterday. An executive of Aero-Jet, also stated that as far as the big firms are concerned, they do not require patents in order to manufacture and sell their products at a profit; that their know-how, their economic strength, and the talent that they possess make it possible for them to do that, even if they have no patents.

Mr. BANNERMAN. I think in this field, which is a very complicated one, as you know, that all generalities are likely to be troublesome, and I think that one is also. I think we would agree that a patent is likely to have far greater value to small business firms than to the large, and our policy of leaving commercial title, if you will, to our patents with our contractors is probably more valuable to small business than it is to large.

Certainly we have seen many companies who, through this reason, have prospered who otherwise might not have prospered. The protection the patents give them in their commercial work is certainly quite valuable.

Mr. GORDON. You stated before that the Aero-Jet Co. does not really derive very many commercial benefits from its patents.

Mr. BANNERMAN. Well, I deduced that, Mr. Gordon, simply from the fact that they are still selling a hundred percent to the Government.

Senator LONG. 99 percent.

Mr. BANNERMAN. 99 percent.

Mr. GORDON. I think Aero-Jet stated that also.

Mr. BANNERMAN. I do not know anything about it other than that.

Mr. GORDON. It is a phenomenal growth, wouldn't you say? Wouldn't you also say that the phenomenal growth of the Aero-Jet Co. is an indication that it is doing very well even without patents?

Mr. BANNERMAN. I think that the phenomenal growth of Aero-Jet is one of these fortuitous things that happens to a company sometimes. It was in the right place at the right time. They developed during the war, as I recall it, this jet-assisted takeoff device that became pretty important to the military departments during the war, and from their techniques and knowledge and from the fact that this type of technology happened to become important in the missile business, they became very large indeed. I think that is what happened.

Mr. GORDON. Would you say that this unusual growth was achieved as a result of research and development contracts with the Government? Consequently, this example shows the great advantages just from taking a research and development contract.

Mr. BANNERMAN. Well, again, let us watch out for generalities. It shows the advantage of Aero-Jet taking these contracts, doing a good job in a field where it turned out there was going to be great demand, to that I would agree with you.

Mr. GORDON. How do you explain that the AEC, which has a policy quite different from yours, has no trouble placing research and development contracts?

Mr. BANNERMAN. Well, we had a hearing on much the same problem last week, and that same question arose, and our answer to that is this: That the AEC problem and the Department of Defense problem are quite different.

The bulk of the AEC research and development work is done for AEC in a few very large Government-owned facilities, very expensive Government-owned facilities that they have built and then had staffed for them by contractors so that the research and development staffs in these facilities are working 100 percent on Government work.

It seems to me that this provides a somewhat different type of situation than we have where we are going into existing commercial staffs and asking them to sidetrack some of their commercial work to take on work for us.

This may very well lead to different conclusions, and also I think there are basic differences in the type of subject matter we are dealing with.

Senator LONG. Let me ask one question about that.

On this committee from time to time I have pressed in favor of split bidding for military transport work. Captain Fitch, I do not know whether you have any familiarity with this or not; but, generally speaking, in repairing and overhauling ships about 70 percent of the cost of it would be work that could be done without putting the ship in a drydock, and about 30 percent of the cost of it would be work that could be performed only by putting the ship in a drydock. You understand the problem, do you not, Captain?

Captain FITCH. Yes.

Senator LONG. I was always trying to get the drydocks people to split their bid, to tell you how much they do or are going to charge for the bottom work and how much they charge for the top work. When you required split bidding, the topside work, that is, the work that could be done while the ship was sitting in the water alongside of the dock or while it was lying outside of the dock at anchor, would cost far less to get done for the Government because all these little individual shops could bid on that and they could go in there and do it, and they would bring the costs far down.

But, on the other hand, if you do not require them to split the bid, you usually wind up paying a great amount more for a drydock to do that work, because since only a few concerns own drydocks, and it would cost a great amount to move the ship from a place where there might be only one drydock to some other place, the drydock would charge a price that would be as much to their advantage as possible, and it would cost a lot more to get it that way.

Now, are you familiar with that practice of requiring them to split the bid, Captain?

Captain FITCH. I never heard of that, Mr. Chairman.

Mr. BANNERMAN. I have heard of that, Mr. Chairman. I came in with the Bureau of Ships, and I am familiar with the practice.

Senator LONG. Don't you believe that by bringing in more competition you save a very substantial amount of money?

Mr. BANNERMAN. In certain areas that was certainly true. I know some of those cases arose up in the New York port area, with a very, very limited number of drydocks, and it was advantageous to split the bids.

Senator LONG It is possible to achieve tremendous savings when letting a large number of people bid on something. By permitting patents resulting from Government-financed research to go to special individuals, giving them monopolies, are we not leaving the American consumers in the situation where they are going to be required to pay a great amount for lack of effective competition in the commercial market?

Mr. BANNERMAN. I think your comment goes right to the heart of the patent system, Mr. Chairman. I think the same is true whenever you issue a patent. You are probably making it possible to eliminate competition for a period of time.

Whether this is good or bad is a matter of opinion. I certainly think that this committee is entitled to look into it and come to whatever conclusions it wants.

The other side of that same coin, of course, is that if you do allow title to remain in contractors or do, in the case where the Government is not involved, grant patents in the first instance, you encourage the devotion of large sums of money to the improvement of these developments to the making of the things suitable for commercial use, and for the exploitation and marketing of them.

Now, which motivation overbalances the other, I think, differs case by case. There is not any question about it.

Senator LONG. We have had some testimony with which I am inclined to agree that our patent system was designed originally to

encourage someone to develop something but not at Government expense.

He would make money from his patents, and would receive royalty and license fees which would pay him and encourage him to develop something by giving him a patent monopoly

But in recent years we have undertaken, particularly in your Department, to spend billions of dollars to pay people to develop these ideas, and these new devices. Sixty percent of all industrial research is paid for by the Government, by the public. Now, when we pay a firm to develop something it does not seem to me, that we should have to reward it with patent monopolies that you would give them if they were paying for it themselves. The hidden tax that would result from the exclusive commercial use of these patents for which we are paying billions of dollars may well turn out to cost the consuming public a lot more than this $6 billion a year you are spending in research and development.

Mr. BANNERMAN. Mr. Chairman, I would like to make two comments with respect to your question.

One is that out of this money that we are paying we are not paying for patent title. Part of the bargain, the package that we buy, is a patent license, but not patent title.

It would be a different package if we were to buy patent title, and undoubtedly in many cases it would be a more expensive package. So much for that one.

The second point I would like to make is that patents that are reduced to practice in conjunction with our contracts are not full-blown ready for commercial use.

Many of these patents require vast sums of additional expenditures to make them suitable for any commercial product or to make any commercial product using them suitable for marketing, and additional moneys are very frequently, if not normally, required to cultivate and exploit those patents.

The question is what kind of an incentive do you want to make to have that work done?

There certainly is plenty of evidence that in some cases where the incentive of a patent is not there, it does not get done The public simply never gets the product. The inventive process stops right there.

Senator LONG. Well, the probabilities are in these cases, though, that the public will get the product, perhaps a little bit later, perhaps even sooner, but the probabilities are that the public would get the product anyway at a much lesser cost.

Captain FITCH. Mr. Chairman, this is a subject that I believe the Commissioner of Patents mentioned yesterday, that the study group 14 was supposed to find out through this research effort, to get the facts. Are any of these patents being exploited, and then put on the American market at increased costs? I think these are the questions that need to be answered before we would know.

Senator LONG. Now, the patents, while they allegedly provide incentive, also do a lot more than that. They also make it possible for the person who holds the patent to deny this to the public and to make the public pay a much higher price for it. That is fundamental to that system. That certainly is correct, is it not

Mr. BANNERMAN. We are describing the patent system. I think what you say is accurate.

Senator LONG. Yes.

Mr. FALVEY. Isn't this a fact, Mr. Chairman, that the holder of a patent has a choice of excluding others from the production of the device or having some royalty revenue? He has got two choices.

Senator LONG. Yes.

Here is the thought that occurs to me. If I were—and I believe that if any person at this table with you, Mr. Falvey, were—drawing up a contract to protect the stockholders of any corporation in America, that I would draw that contract so that my scientists and engineers would turn over to me everything they developed while they were working for me, and that my stockholders would have the benefit of all the money that was made from those patents. Above all, I would see that those stockholders would not have to pay a very high price to get the benefit of the very things that we developed under the terms of that contract, that is, pay a second time to get what we developed under the terms of that contract.

Practically every corporation in America does it that way. That is the way you would advise your board of directors to do it. That is how the contract you would propose would be drawn up in representing your stockholders. I would expect any business on earth to fire me as a lawyer if I drew up a contract that said we would not have the benefits of developments or ideas of our employees in our plant from which we can make a big profit.

Now, here we have 170 million American people, stockholders in this country, and here are contracts being drawn for which our people are paying $6 billion a year. In addition they are going to have to pay a second time a lot more than that $6 billion to get the benefit of the very thing they are developing with their money.

It seems to me we ought to get it for the American people who pay for it under those contracts. Even if it costs a few more dollars, it would be a small part of the social costs resulting from the granting of monopoly rights and the resulting higher prices resulting from these monopolies.

Mr. FALVEY. Mr. Chairman, Mr. Bannerman's comment on that was that we in the Department of Defense buy what we need. If we were to pay some extra amount of money to get title, as distinguished from a license, the speculative value of the patent to which we get title—let me put it another way: It is speculative as to what the commercial value might be. We might have to pay something extra for something we would not know how to evaluate.

Senator LONG. My guess is that if, when you asked for bids on any research and development contracts, you included the question: Will you agree to turn over the patent rights resulting from the research, to the U.S. Government, and if the policy was that, all things being equal, you were going to prefer the fellow who would give the Government the benefit of those patent rights, it would not cost you an extra 5 cents—not on your big contracts.

Now, it may be that in certain cases you may have some difficulty.

Suppose you wanted Standard Oil to develop a new fuel. Since they are spending a lot of their own money on it already, they might say, "No, we are not interested on that basis." In that particular case, since only a very small percentage of the money would be coming from the Government, you could legitimately say: "Well, all right,

that being the case it would be worth waiving patent rights." The petroleum industry itself, we must remember, supplies 96 percent of its research and development funds. If a patent policy is administered with intelligence and flexibility, the Government, I would estimate, could get the patent rights on perhaps 90 percent of what you are developing, without any additional dollar costs.

Mr. BANNERMAN. Mr. Chairman, the bulk of our research and development work, as I said before, is done under those cost reimbursement types of contract under which we reimburse costs, sometimes sharing costs, but usually reimbursing costs with a slight override or fee.

This work is done, it is our policy to do this work, in those laboratories or research facilities which, in our best judgment, are the most advanced or highest qualified technically in the field or technology in which the particular project exists.

The reason for this is twofold: First, if we use the most advanced research laboratory that there is in the field in which we are dealing, we are likely to get our research done for us faster than if we would go to somebody who had to repeat work that had already been done by a more advanced laboratory.

Secondly, it being a cost reimbursement type of arrangement, we are likely to get it done cheaper that way, so that it is not any answer to say that if we went out competitively for our research and development work we might find someone—and I think I would agree that we might in many instances find someone—who would agree to do the work and, at the same time, give us title to any inventions which might ensue.

This would render it impossible for us to use many of the best qualified laboratories in the country, and certainly would frequently require us to go to somebody who was not as advanced as others.

We feel that in view of the tremendous volume of our work which you have already commented on, that we need to use all of the good laboratories for those things for which they are best suited, and there is not any question but what many of these laboratories that are in commercial work simply would not take our work on that basis.

Senator LONG. Well, you understand what I was suggesting. My guess is if you took the patent rights away you could get them from equally qualified contractors, that you would get most of your patent rights without any additional costs.

Mr. BANNERMAN. Mr. Chairman, another thing I would say that such a policy would be rather unfair to small business. There is not any question but what on the average your small business firms would be under more economic pressure to give us these patent rights than some of the larger firms and, on the other hand, as you know, the patent rights probably are more valuable to them than they would be to the larger firms, so we would be trading on our——

Senator LONG. Let me say this: For every small business that is helped by having patent rights, there are a score of other small ones who either cannot gain entry into a industry or who are hurt because of the patent advantages another firm may have.

Mr. BANNERMAN. Well, that gets back, of course, to the question, Do you want to encourage inventiveness or do you——

Senator LONG. You only encouraged them by about $6 or $7 billion a year. Nobody ever did that before. That is quite an encouragement. Isn't $6 billion quite an encouragement?

Mr. BANNERMAN. There is not any question about it, and we think that encouragement is augmented by the policy which we follow of taking that which we need and leaving the fruits, the commercial fruits of the invention to the inventor. There is no question but what it is an encouragement.

Senator LONG. You can foresee the possibility though that the American people who are paying all the taxes for this will have to pay a second time?

Mr. BANNERMAN. Mr. Chairman, we disagree they are paying a second time.

Senator LONG. A second time to get the use of this commodity. Well, it means this, you and I know that we could buy something a lot cheaper if we have to compete for it, do we not?

Mr. BANNERMAN. This may well be true.

Senator LONG. Is that correct?

Mr. BANNERMAN. In given cases that may well be true.

Senator LONG. Ninety-nine and nine-tenths percent of the cases.

Mr. BANNERMAN. Well, I would not go that far.

Senator LONG. Have you ever seen anything that you could buy cheaper because there was no competition in the field? Take any instance, just anything that you could buy cheaper because there was no competition?

Mr. BANNERMAN. I do not think it would be possible to demonstrate that one way or the other.

Senator LONG. The whole range——

Mr BANNERMAN. I would agree with you.

Senator LONG. Isn't it true that the whole fundamental concept, the fundamentals of this free enterprise system, which we claim to believe in so dearly, rests on the principles of competition, and that our laws are shaped to encourage competition on the theory that competition is in the public interest because it gives us better prices and it gives us the most goods for the most people?

Mr. BANNERMAN. Part of the system, of course, is our patent laws, and they are not shaped that way.

Senator LONG Yes. But isn't that an exception to the American ideal of competition?

Mr. BANNERMAN. Well, it is part of the American ideal, and it is different from the notion of competition; with that I agree.

Senator LONG. It is monopoly, is it not? The patent system is monopoly.

Mr. BANNERMAN. It is designed to be, for a good and sufficient reason.

Senator LONG. Yes. But the important point I am getting at—and we seem to agree on it—is that without exception you are going to get things a lot cheaper if you have effective competition. If you can provide an exception, I would like to have it.

What you are doing is letting these people have legalized monopolies across the width and breadth of this land and we are paying these people to achieve the monopolies. All I am saying is that the American people are going to wind up paying a lot more than this $6 billion

a year as a hidden tax in the price of those commodities, as a result of all these patent monopolies that you people are letting these people keep. My suggestion is that if there is some small dollar cost involved, we ought to pay it to protect ourselves from having to pay it a second time in the form of monopoly profits. You would certainly do that if you were representing any corporation in America and were drawing up a contract with an engineer or a subcontractor. You would seek to get those benefits for your principal. In this case, however, your principals are the people of the United States.

Mr. BANNERMAN. Corporations are generally in the business of manufacturing products and for commercial use, and hence they probably have need for such things that we do not have. We are not in that business.

Senator LONG. You say "we," do you mean "we, the American people," or "we, the Department of Defense"?

Mr. BANNERMAN. I am talking about "we, the Department of Defense."

Senator LONG. You do not mean "we, the taxpayers," either?

Mr. BANNERMAN. We would place an additional charge upon the taxpayer if we were to follow such a policy. Now, whether they would gain it back through cheaper products I am not prepared to say because I think it is entirely speculative.

Senator LONG. My guess is that if you let me pick out these patents that these folks are getting, I could find just one of them, just one of them, where I could recoup over a period of years any extra cost of pursuing this policy.

Mr. BANNERMAN. At the time we make our research and development contracts that is the time we would be required to pay the extra money, if we changed our policy.

Now, as Mr. Falvey has said, at that time we have no knowledge whatsoever as to what inventions may ensue or whether any inventions will ensue, and if they do, what they are going to be worth or what the commercial rights would be worth.

I would hate to be in the position of trying to figure whether that policy in a given contract in prospect is worth $10, $10,000 or $10 million. You just do not know. There is no way you can say what it is worth.

Senator LONG. Do you think it is in the national interest to prevent further economic concentration?

Mr. BANNERMAN. Congress has said so, and we certainly agree with it.

Senator LONG. I am asking you, I would like to ask Mr. Falvey, let him answer—I think you are a good witness, Mr. Bannerman, but I think I will ask the principal witness the question.

Mr. FALVEY. Would you repeat the question?

Senator LONG. Do you think it is in the national interest to prevent further economic concentration?

Mr. FALVEY. A further economic concentration of industry?

Senator LONG. Well, further economic concentration in large corporations or in a few corporations.

Mr. FALVEY. I do not know that we in the Department of Defense have much choice. We have to go where the talent is available.

Senator LONG. I want to know your opinion as an American and I want to know whether you believe it is in the national interest to

prevent further concentration of economic power in the hands of any given number of corporations.

Mr. FALVEY. I will accept that.

Senator LONG. Do you think that to be correct?

Mr. FALVEY. All right, I will accept that.

Senator LONG. Do you think it would be in the national interest to protect the efficient small business sector of this economy?

Mr. FALVEY. Yes, sir.

Senator LONG. Do you believe it would be in the national interest to maintain a competitive, free enterprise system, and I emphasize competitive?

Mr. FALVEY. Yes, sir; I subscribe to all those.

Senator LONG. Well then——

Mr. FALVEY. We may differ as to the means.

Senator LONG. Would it not seem logical that you would have a lot more competition if you allow concerns, large numbers of them, to compete in manufacturing those commodities that are being developed for the American market, rather than granting large numbers of patent rights to some of them and thereby excluding others from the field?

Mr. FALVEY. I do not believe I understand that question, Mr. Chairman.

Senator LONG. Would not the granting of patent rights in a great many cases result in the creation of monopolistic situations?

Mr. FALVEY. I will accept your statement for that, Mr. Chairman.

Senator LONG. I would like to know what you think, Mr. Falvey. Is it not entirely likely that you would have monopolistic situations as a result of your policy of granting so many patent rights?

Mr. FALVEY. It is within the realm of possibility. I do not think the question can be answered yes or no, Mr. Chairman.

Senator LONG. All right.

Captain FITCH. Mr. Chairman, as a matter of comment, as you well know, if this monopolistic situation is an evil, the Department of Justice will certainly see to it that that is straightened out, which it has done in many instances.

Senator LONG. There is nothing you can do about a patent monopoly, there is very little the Department of Justice can do about that.

Captain FITCH. No, not as to one patent, but I thought you were suggesting that some one business corners the whole industry.

Senator LONG. Captain Fitch, some monopolies in this country are legal and some are illegal. Monopolies achieved by patents are, for the most part, legal, that is, in and of itself.

Do you care to comment on that, Mr. Johnson?

Mr. JOHNSON. Well, in many cases where an antitrust action has been instituted against a corporation, the end result has been the compulsory licensing of the patents held by the corporation, and you can, the Department of Justice would comment on that, I am sure, if you ask them that question.

Senator LONG. Do you know what the Department of Justice has recommended about your practice?

Mr. JOHNSON. I know what they have recommended; yes, sir.

Senator LONG. What is their recommendation as far as your practice is concerned?

Mr. JOHNSON. Their recommendation, which was stated in the report of 1947, is that as a basic policy—in fact we quote it in our statement to you:

> As a basic policy, all contracts for research and development work financed with Federal funds should contain a stipulation providing that the Government shall be entitled to all rights to inventions produced in the performance of the contract.

Senator LONG. That was 1947?

Captain FITCH. That was modified, Mr. Chairman, in the Congressional Air Policy Commission in 1949 when the Attorney General in conformance with the Congressional Air Policy Commission recommendations, accepted all of their recommendations, and modified the previous statement to say that only when all of the research was paid for by Government money should the Government take title. Where the contractor contributed any of his funds or any of his facilities or any of his information, then it should be negotiated.

Senator LONG. Negotiated in what respect?

Captain FITCH. As to who would get the title or who would get the license.

Mr. GORDON. Mr. Falvey, do you feel it is possible or, perhaps, even likely that adding patents—don't forget that a patent is by definition a monopoly in a particular market—to an already large portfolio of patents will give even greater market control to an already very large company?

Mr. FALVEY. Conceivably possible.

Mr. GORDON. Wouldn't you say that this tends to make the already large larger, and the small relatively smaller?

Mr. FALVEY. It might or might not.

Mr. GORDON. Doesn't that follow? Since perhaps 95 percent of the R. & D. contracts go to the very large companies; doesn't that follow?

Mr. BANNERMAN. I would like to make one comment there, to avoid brevity, Mr. Gordon.

The fact of the matter is a very high percentage in numbers, not in dollars, but in numbers of our contracts for research and development are placed with small business concerns.

Mr. GORDON. Not in dollars though.

Mr. BANNERMAN. I said not in dollars.

Mr. GORDON. But dollars happen to be——

Mr. BANNERMAN. The fact of the matter is we have to place a relatively small number of huge contracts for research and development, the kind the chairman has referred to earlier.

Those contracts cannot go to anybody but large business, and they make up a very high percentage or a very high portion of this 95 percent you talked about.

But I would like to give you another figure, just so the record will be clear on this.

In 1958, the last year for which we have final figures, we made a study of all of the research and development contracts that we had placed, and of the top 400 companies, tops in size of awards granted in that year, 150 of them were small business concerns.

Mr. GORDON. All right.

But in dollar terms, however, 95 percent or approximately that figure goes to big business, and this is the relevant criterion.

Mr. BANNERMAN. Yes. But if you place a $100 million contract for one missile——

Mr. GORDON. I am not asking you why this is so.

Mr. BANNERMAN (continuing). With one company you are not necessarily providing a hundred times as much inventive possibility as you are in a $1 million contract. This does not follow.

Mr. GORDON. Do you have any people in your Department who study the effects of your patent and data policies on the rest of the economy, on these problems we are talking about?

For example, do you have anyone studying the possible effects of giving away title to a very important invention on market control, competition, on economic growth, and such other subjects?

Mr. BANNERMAN. Mr. Gordon, we do not have this in the Department, but we are cooperating very closely with the task force operation which is doing just that, the organization to which Commissioner Watson testified yesterday.

Senator LONG. Do I understand, Mr. Falvey, that the answers made by your consultants you adopt as your own?

Mr. FALVEY. I do, Mr. Chairman.

Senator LONG. I would suggest that where Mr. Falvey wants to answer the question, he go ahead and answer it, but when one of the technicians or one of the consultants that he has here wants to answer it, then he may do so.

Mr. GORDON. Mr. Falvey, you say on page 8 [35a] of your statement: "If industry lost its hope of the commercial market through a requirement that title to the inventions resulting from Government work be vested in the Government," and so on and so forth. Do you recall that sentence?

Mr. FALVEY. Yes, I see that right here.

Mr. GORDON. Are you implying that if the Government took title, business firms would not be able to sell to the commercial market? This is really not the point, is it?

Mr. FALVEY. No.

Mr. GORDON. The Government taking title would not have an effect on the commercial market, would it?

Mr. FALVEY. No. I am saying that the punchline is in the last part of the sentence, "Our ability to secure the services of qualified and competent firms would be impaired." They just would not be interested.

Mr. GORDON. Are you saying, then, that if the Government took title the firm would not have access to the market?

Mr. FALVEY. I am not suggesting that at all.

I am suggesting that if the Department of Defense had a requirement for taking title there would be many concerns that would not be interested in the contract, the research contract.

Mr. GORDON. Do you feel that the granting of a monopoly in a particular market is the necessary inducement for qualified and competent firms to work for the Government?

Mr. FALVEY. It may be a necessary evil; it may be the lesser of two evils.

Mr. GORDON. Do you think that both the direct and social costs we are paying are too high, perhaps? Do you think, as the Senator suggested——

[35a] See p. 341.

Mr. FALVEY. Do I think the costs we are paying—no, I do not.

Mr. GORDON. I mean the real costs to society, not the monetary expenditures of the Defense Department.

Mr. FALVEY. I think society is interested in the Department of Defense, too. I think society is interested in seeing an efficient, effective Department of Defense for the defense of this country, and I think it behooves the Department of Defense to get the best technical brains that we can possibly get, and to go where we have to go to get them.

Mr. GORDON. It is true that society is interested in that problem.

Mr. FALVEY. Sure they are.

Mr. GORDON. It seems to me society is interested in other problems, too.

Mr. FALVEY. True.

Mr. GORDON. I refer to the problems we are talking about, like the maintenance of the competitive system.

Mr. FALVEY. Yes.

Mr. GORDON. Would you agree with that?

Mr. FALVEY. I think we have to defend the country first to have the system to defend.

Mr. GORDON. Are you suggesting that they are both inconsistent?

Mr. FALVEY. I am not suggesting that at all, but I think we have got to get things in proper sequence.

Mr. GORDON. You state on page 8 that it would be a waste of time, energy, and money for the armed services in their contracting to require rights which, if obtained, would not be used.

Mr. FALVEY. Right.

Mr. GORDON. How do you know they would not be used? Do you have any evidence? Suppose you take title and put it in the public domain—I do not mean that you acquire rights and then put them in the desk drawer. You can take title and put it in the public domain.

Mr. FALVEY. Are you suggesting we get into the business of issuing licenses for royalities?

Mr. GORDON. Well, other agencies are doing that, either collecting royalties or dedicating Government-owned inventions to the public.

Mr. FALVEY. From my observation the Department of Defense has got enough problems without getting into that one.

Mr. GORDON. Are you saying that the Department of Defense has no interest in this particular subject?

Mr. FALVEY. Well, it certainly would be secondary.

Mr. GORDON. Well, then, does it have at least secondary interest in the subject?

Mr. FALVEY. I say if we had an interest it would be secondary. Our primary mission is the defense of the United States, and we put that out in front.

Mr. GORDON. What do you mean that it would be a waste of time, energy and money? Do you mean that it would require more time?

Mr. FALVEY. What page are you on?

Mr. GORDON. Page 8. (See p. 341.)

Mr. FALVEY. All right. I think that statement is self-explanatory, in a contracting operation to require rights which, if obtained, would not be used.

Mr. GORDON. You assume that they would not be used. My question is: How do you know they would not be used if they were dedicated to the public? Are we talking about the same thing?

Mr. FALVEY. I am saying that the Government has got the rights to use, to make, or have made under this license procedure that the Department of Defense follows.

Mr. GORDON. Many items which are developed at the expense of the U.S. Government have commercial application.

Mr. FALVEY. It could be.

Mr. GORDON. In fact, it has been demonstrated that they do have certain processes developed at Government expense. For example, the processes used in the Nicaro plant.

Mr. FALVEY. Oh, yes.

Mr. GORDON. In that particular case the General Services Administration took title to all of the processes and all the machinery in that plant. Why? Because if it had not taken title, it would have to sell the plant to the holder of the patent rights of machinery and the processes. But it took title in order to be able to sell the plant to the highest bidder, to anybody it wanted to sell it to.

This is one example where it was to the advantage of the Government to take title.

Another advantage was——

Mr. FALVEY. Incidentally, I do not think that the Nicaro operation was too sweet, but we won't go into that. It was not any bonanza for the Government.

Mr. GORDON. As I understand it they have not sold it yet.

Mr. FALVEY. Yes, that is what I am getting at.

Mr. GORDON. But they are trying to sell it.

There is another example where the Government paid $250,000 to the Automotive Engineering Corp. for 71 automotive patents.

The records in the possession of the General Services Administration indicate that the United States received from these patents in cash royalties and in royalties saved an amount in excess of $3 million. This is a matter of public record.

Mr. FALVEY. I do not question that.

Mr. GORDON. The War Assets Administration widely publicized it.

Now, even if the Government had no use for it for itself, if it takes patent rights perhaps it could recoup some of the money. In this particular case, the Government paid $250,000, and it made in excess of $3 million.

Mr. FALVEY. From selling patents?

Mr. GORDON. No, from royalties.

The War Assets Administration widely publicized the proposed sale, and received only two bids. The high bid was $25,000 by the Timken Detroit Axle Co., which held the license under the patents.

The second bid was $5,100 submitted by a World War II veteran.

The War Assets Administration rejected the two bids as inadequate, and the proposed disposal was never consummated.

Mr. FALVEY. Some patents are good and some are not worth the paper they are written on.

Mr. GORDON. All right then.

In that situation we use discrimination. Some we give away and some we do not.

Mr. FALVEY. How do you tell what the commercial use of the device is? You do not sell the patent, but you sell the device incorporating an invention.

People are fickle. Some things they like to buy are patented and some are not.

Mr. GORDON. If the businessmen are willing to pay and take a chance, it may be reasonable to assume that it does have a good chance of being profitable; wouldn't you say?

Mr. FALVEY. They goof once in a while, too.

Mr. GORDON. And they make money on it, generally, do they not?

Mr. FALVEY. Out of what, patents?

Mr. GORDON. Yes.

Mr. FALVEY. No. They make money out of selling their products.

Mr. GORDON. All right; selling their products on which they have patents.

Mr. FALVEY. Whether they are patented or not. If they have something the public likes the public will buy it, patented or not.

Mr. GORDON. Do you always secure sufficient data so that if the Department of Defense wants to switch producers, say, even in midstream, it can do so? Do you get adequate data so that component parts can be manufactured by small producers?

Mr. FALVEY. I believe that question was answered, in part, by Captain Fitch, and in part by Mr. Bannerman.

Mr. GORDON. And the Senator, I think, brought to your attention that we had two small businessmen who testified to the contrary.

Mr. FALVEY. Pardon?

Mr. GORDON. I believe that the Senator mentioned to you that we had two witnesses a couple of days ago who testified to the contrary.

Mr. FALVEY. That was unavailability of parts, as I understood it. I am not putting parts——

Mr GORDON. Not only parts—Mr. Peirez of the Viewlex Co., if you will look at the transcript, stated that 3 years after the product was developed he was still unable to get the data. (See p. 22.)

Mr. BANNERMAN. Mr. Gordon, our policy with respect to getting data is clearly outlined in the Armed Services Procurement Regulations and is followed by all hands now. It is a relatively new policy which was issued about a year and a half ago. It is quite possible that different procedures were followed in contracts that are older than that.

But repeating what we said earlier, we do get such data with respect to our developmental contracts.

Mr. GORDON. Let me ask this question: When the United States pays for the development of a particular item, I presume it does not pay for the set of papers it gets, it pays actually for all the knowledge that has been acquired; is that correct?

Mr. FALVEY. The papers that you refer to are, perhaps, a record of that knowledge, intelligence, background, know-how, whatever you want to term it.

Mr. GORDON. Therefore, the data would be owned by the U.S. Government; is that correct?

Mr. FALVEY. I believe that is correct.

Mr. BANNERMAN. Data furnished under developmental contracts are owned by the U.S. Government; correct.

Mr. FALVEY. You get my point on the paper, don't you? That just shows the intelligence.

Mr. GORDON. Mr. Monesmith, who testified for the Lockheed Co., was asked what would have happened with the German transaction you probably know about, if the Government had taken title to the F–104. He stated that the Government would have owned the data. He was then asked how would that have affected the F–104G negotiations. I think he answered something to the effect that the Government certainly would have had some financial interest in the F–104G if it had owned the data on the F–104.

Mr. FALVEY. I am not familiar enough with that to comment on it.

Mr. BANNERMAN. The Government's taking data does not provide the Government with any exclusionary rights or ownership with respect to others.

We cannot—we do not license this data and then use it. We get that data for our own use.

Mr. GORDON. On page 11 of your statement you say that it is in the best interests of the United States to encourage the development. Is it possible that if a company can get the Government to pay for the development of an item, and if it gets exclusive commercial rights to it, it would tend to discourage the development of items at private expense? In other words, if a firm can get the Government to foot the bill in developing an item, why should it use its own money to develop it?

Mr. FALVEY. I do not think I understand the question so I will not attempt to answer it.

Mr. GORDON. All right.

You say on page 11 (see p. 342) that it is in the best interests of the United States to encourage the development of items at private expense.

Mr. FALVEY. Right.

Mr. GORDON. Do you see that?

Mr. FALVEY. Yes, I do.

Mr. GORDON. All right, then. It is possible that if the company can get the Government to pay for the development of an item, say, some electronics device, and if it can get exclusive commercial rights, too, would it not tend to discourage the development of items at private expense?

Mr. FALVEY. Maybe somebody else understands that question, I do not understand it. I am sorry, you repeated it twice.

Mr. BANNERMAN. I think the answer, Mr. Gordon, would be that it does not tend to discourage it. The fact of the matter is that we are now talking about data rather than patents, and——

Mr. GORDON. Commercial rights, exclusive commercial rights.

Mr. BANNERMAN. No, we are not either. We are saying, we are talking about, data here in the sentence you read. If we honor proprietary data developed at private expense rather than at our expense, we are thereby making it profitable for people to invent.

If we pirate that data, we are making it unprofitable for them to invent, and I think that is all that sentence is trying to say.

Senator LONG. Let me just ask you, why do you think it is pirating? You used the word "pirating." It would seem to me it would be almost like calling it murder to kill somebody in wartime. It happens to be your duty.

By "pirating," are you referring to a practice where you simply tell someone: "I would like to sign a contract to get you to develop something for me. If you can develop this product I want it, because I would like to have all the rights to it. I would like to make an agreement with you to pay a fixed amount of money for which you will develop this and turn over all the rights that you presently have, as well as the rights you develop." Do you call it pirating when you buy it and pay for it?

Mr. BANNERMAN. No, Mr. Chairman, that is not what we are talking about here. We are talking about a situation where a company without a contract with us at all proceeds to develop what it conceives to be a useful item and proceeds to sell it. As its own product, all of the data with respect to that product, was developed at private expense, not at governmental expense.

Thereafter, the Government becomes interested in that product and decides to buy that product. We would consider it pirating if we stole trade secrets and proceeded to have them made by others at that stage of the game without paying for them.

Senator LONG. Most of the time business firms come to the Government looking for business. If you buy the rights that a firm has, the technical data, the secrets it has, you do not call that pirating; do you?

Mr. BANNERMAN. Not if we bought it; no, sir. It is where we have not bought it.

Senator LONG. Because we had a witness up here a few days ago representing some small business who thinks your policy does not favor his people enough. He was up here telling us that the policy you fellows followed usurps the constitutional right of his association people to their patents, usurps their constitutional rights.

Now, it sounded to me like a speech—the speech sounded fine if you made it to a bunch of fat cats who have these patents. On the other hand, if you were making that to just an ordinary businessman, he would say that was ridiculous. He would say, "All I did was to offer you a contract similar to the one you are making with your employees."

Mr. BANNERMAN. Mr. Chairman, we have taken the middle ground as between those two extreme positions.

Senator LONG. Yes.

Mr. BANNERMAN. And we think it is the right one.

Senator LONG. While we are on this subject, does anyone here know of any constitutional right that a person has to a patent?

Mr. FALVEY. I think the patent law is based on a constitutional provision.

Senator LONG. Does the Constitution confer a right on any individual to have a patent?

Mr. FALVEY. If I recall the constitutional provision, it says that Congress shall encourage the useful arts by securing to inventors for a limited time only the use of their inventions.

Senator LONG. Let us get that provision and read it.

Mr. FALVEY. I was not trying to give it verbatim, Mr. Chairman.

Senator LONG. I believe you will find it says this, that Congress shall have the power to grant patents; it does not say Congress shall exercise it. It says Congress shall have the power to grant patents.

Now, Congress could have granted the patents directly, and had a debate everytime somebody wanted a patent. But instead we passed

a law and conferred that power on the Patent Office, and we set out the way that the law would be administered. But the right of anybody, just anybody, to walk up there and apply for a patent is the result of a statute that Congress passed.

So the right of an individual is a statutory right. The Congress, the Constitution says, shall have the power to declare war, as you are familiar, but that does not mean we have got to declare war or anybody has got a right to file a lawsuit to make us.

Mr. FALVEY. I was not suggesting that, Mr. Chairman.

Senator LONG. And we can declare ourselves to be at war.

I think you and I agree that the right to the patent is statutory.

Mr. FALVEY. I think the Constitution encourages Congress then, let us say.

Senator LONG. The right is a statutory right, is it not?

Mr. FALVEY. All right, sir; yes, sir.

Senator LONG. That is my conclusion, and I see your assistant is nodding. It is the right that comes from the statute. Congress could either do it or not do it, based upon what it thought was in the public interest, and I assume that is what Congress has been trying to do with all these patent laws.

Mr. FALVEY. That is right.

Senator LONG. When someone tries to tell me he has a constitutional right to a patent which I am usurping, then I cannot agree with him because I do not see anything in the Constitution that grants him that right. Congress has the power to do it, and the right he has comes from the statute that we passed.

Mr. JOHNSON. Senator, excuse me. What the Constitution does is to give Congress the power to permit limited monopolies in the fruits of inventions by inventors and authors.

Senator LONG. Right.

Mr. GORDON. One more question, Senator. As I understand it, the general practice in business is that the firm which pays for the research and development gets all rights.

Now, the Boeing Co. testified to that effect before our Government Procurement Subcommittee. Boeing had other people develop something for them, paid them for it, took out a patent on it, received royalties on licenses.

Boeing did not give patent rights away as the U.S. Government does.

Why should the Government's policy be any different?

Mr. FALVEY. We contract for this scientific, these scientific developments. We buy, as we testified, what we need. We do not pay more on some speculative value.

Mr. GORDON. By "we" you mean the Department of Defense?

Mr. FALVEY. Yes.

Mr. BANNERMAN. Mr. Gordon, let us make one other comment with respect to that, too. The big research departments of manufacturing corporations are not available to Boeing on any such arrangement as the one you just talked about. They are not in the process of developing things for other manufacturers or competitors and giving away title.

Boeing would probably go to a research foundation or some place of that sort that is not in the manufacturing business, in which case they would take title, and the foundation would not have much need for it anyway.

Mr. GORDON. You are stating, then, that in most cases many firms will not take a Government contract unless they could get exclusive commercial rights; is that correct?

Mr. BANNERMAN. We have said that.

Mr. GORDON. This is a statement of fact, and I think, perhaps, we can test your hypothesis.

Mr. BANNERMAN. That is what the task force we talked about is trying to do, Mr. Gordon.

Senator LONG. Will you provide us with a list of those contractors who have indicated that they would not do research and development work unless they were able to obtain the patent rights?

Mr. FALVEY. That is a rather negative thing, Mr. Chairman.

Senator LONG. I will tell you people why you would not be the ones to know it. If it is known, it should be known by the Atomic Energy Commission because they are the ones who do require you to turn over all your patent rights. You are not asking it of your contractors, and it would not be relevant in your negotiations.

Mr. BANNERMAN. It would not be in our files at all.

Senator LONG. That is the point. You would have to go out and ask it, and it would probably be a self-serving statement when we got it.

My guess is that we may be able to find out by asking the Atomic Energy Commission.

Mr. BANNERMAN. Recognizing, as you review their work, they have a different kind of program than we do.

Senator LONG. Do you have a copy of a contract that you make with this research and development work, particularly the part that relates to patent rights?

I ran across this, and I understand this is in your contracts:

> The contractor agrees to and does hereby grant to the Government an irrevocable, nonexclusive, nontransferrable, and royalty-free license to practice, and cause to be practiced by or for the U.S. Government throughout the world, each subject invention in the manufacture, use, and disposition according to law of any article or material, and in the use of any method.

It is the second sentence to which I make particular reference:

> No license granted herein shall convey any right to the Government to manufacture, have manufactured, or use any subject invention for the purpose of providing services or supplies to the general public in competition with the contractor or the contractor's commercial licensees in the licensed fields.

Is that in your contract?

Mr. FALVEY. Yes, sir.

Senator LONG. Here is the thought that occurs to me. Why should we agree when we are representing the U.S. Government which, after all, is the Government of all the people of the country, that in spending all this money to develop things, the Government will not have the right to provide services to its people when, after all, the Government, I always thought, more or less was the people.

Mr. FALVEY. I might make this observation, Senator: The Government is not in the commercial business, and that is, in effect, what that clause says.

Senator LONG. Well, let us just——

Mr. FALVEY. It will not go into commercial competition.

Senator LONG. Let us just take a simple example.

Mr. FALVEY. All right.

Senator LONG. The Railway Express Co. is in competition with the Post Office; isn't that correct? Both of them have testified, let us put it that way.

Mr. FALVEY. Yes, I would say yes, if both have so testified.

Senator LONG. I have voted for legislation to help the Railway Express with their problems, just based on that very assumption.

If you or the Post Office develop something under a contract which has this clause in it, if the developer licenses the Railway Express to use this commodity, then the Post Office cannot use it. If the Post Office takes a commodity without the consent of the person who developed it, and proceeds to use it in the Post Office, that would be against the law, because it is providing services to the people.

Mr. FALVEY. I do not place that interpretation on it, Senator, definitely not. That is not my understanding of the operation of that clause.

Senator LONG. That is not what you intended, but it covers it just like gravy covers rice.

Mr. BANNERMAN. Mr. Chairman, the purpose of that clause—excuse me.

Senator LONG. I know the purpose you have in mind—at least I think I know what you intended—based upon your previous statement. It seems to me, however, that clearly you could not provide a service in competition with anybody licensed by the man who develops this thing for you under that clause, even though you paid to have it developed.

Mr. BANNERMAN. The purpose of the clause is to prevent the Government from using the license for nongovernmental purposes, and those are defined as the use of the license for the manufacture of the product using that patent, and sale to the public. That is what is sought to be avoided. That has been the uniform interpretation of the clause for some years in the Military Departments.

I am not aware of the Post Office problems in this, although I was here yesterday and heard it discussed, but we will be glad to give you a memorandum of law on that, if it would be helpful to you.[36]

Senator LONG. I will be pleased to have it. But permit me to say that with respect to this problem I am stating the conclusion of Senator Joseph O'Mahoney,[37] who is one of the top lawyers on the Judiciary Committee. It is the opinion of the Subcommittee of the Judiciary composed almost exclusively of good lawyers. It is the opinion of the staff of the Judiciary Committee who looked into this problem. I would submit to you, if you do not think that you are in trouble with this clause, that you had better take a good second look because this is one of those cases where you draw a contract which does not state precisely what you mean.

My second thought is this, and I am referring to the Weather Modification Contract of the National Science Foundation. If we are successful in controlling weather, in making it rain in certain areas—and I hope down our way we can make it rain before it gets to us because we usually get too much water during most of the year—if we are successful in making rain fall where we want it

[36] See exhibit XIII(B), p. 335.
[37] See Senator O'Mahoney's letter, exhibit I, p. 3.

it to fall, a person who had any component part necessary to achieve this, or who received a license from the contractor, would be in a position to prevent the Government from using these rainmaking devices for the benefit of the people unless we pay this fellow his price.

Mr. BANNERMAN. Mr. Chairman, if we were in the business of developing items which we wanted developed for sale or use by the public, which we occasionally have done, we would not include this clause in our contract. We would eliminate this clause, and that is exactly what we do with respect to developments of Civil Defense devices.

Senator LONG. The people who included this provision in their contract got it from you because it has been in your contracts all along. Now, they have what they say is not a typical clause but some fellow asked for such a provision and he got it. So if he has some success in developing a rainmaking machine, or something to seed the clouds or control the weather, and he is in the business of controlling the weather, or he licenses it to someone who is in the business, then he is in the position to block the Government from using it. In fact, the Government has actually agreed that it will not use all of these things we paid for to provide services to the people. That is what it says right here in the contract.

Mr. BANNERMAN. I think it likely that such clause should not have been included in such a contract.

Mr. FALVEY. It is a rather indiscriminate use of the clause.

Senator LONG (reading):

No license granted herein shall convey any right to the Government to manufacture, have manufactured, or use—

that is to use, even if the other fellow manufactures it—

any subject invention for the purpose of providing services or supplies to the general public—

that certainly covers the rainmaking situation—

in competition with a contractor or the contractor's commercial licenses in the licensed fields.

Mr. FALVEY. Yes, sir.

Mr. BANNERMAN. Mr. Chairman, we are basically, as you know, in the military business, and we do not have our products produced for sale to the public, and in assurance of that we have put this clause in our contracts where we are making this kind of a contract.

Where, on the other hand, there is some likelihood that we will want our product to be sold to the general public, we would not put that clause in there, and with respect to the rainmaking device that, of course, was not our contract. It sounds from what little I know about it that it should not have been in there.

Senator LONG. Well, it should not have been included in the Post Office contract either.

Mr. FALVEY. I do not think the Post Office Department is in the business of selling mail sorters to the general public.

Senator LONG. But they are in the business of providing a service.

Mr. FALVEY. That is right.

Senator LONG. They provide a service in competition with Railway Express insofar as delivering parcel post.

Now, assuming that the firm that developed the machinery for the Post Office licensed Railway Express to use the same machinery, then under the terms of the Post Office contract the Government, the Post Office, would not have the right even to use it, to provide service to the public even if the machinery is bought from the very firm that was paid by the public to develop it.

It seems to me it should be provided as the very minimum that if the Government pays most of the expenses of having something developed, it should have the privilege of using it to provide services to the people who, I think, actually are the Government.

It is a matter of saying that the people ought to have the privilege of benefiting ourselves.

Mr. BANNERMAN. Mr. Chairman, I think we understand each other on this point. I think there is, perhaps, some disagreement as to what the clause means.

Certainly we will be glad to review the clause, and if we find the same vagueness in it, we will change it.

On the other hand, if we feel, after review, that we are very confident in what it means, we will be glad to provide the committee with a memorandum of law on that subject, if it would be helpful.

(The information subsequently supplied by Mr. Bannerman follows:)

EXHIBIT XIII(B)

LETTER FROM G. C. BANNERMAN, WITH ACCOMPANYING MEMORANDUM RE PATENT RIGHTS CLAUSE IN ASPR 9-107.2(b)

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE,
SUPPLY AND LOGISTICS,
Washington, D.C., January 21, 1960

SELECT COMMITTEE ON SMALL BUSINESS,
U.S. Senate.

GENTLEMEN: This will supplement my letter of December 16, 1959, with respect to material to be furnished for the record of the hearings before the Subcommittee on Monopoly of the Select Committee on Small Business on December 10, 1959.

During the course of the hearings, there was a discussion which related to the meaning of the second sentence in subparagraph (b)(1) of the patent rights clause set forth in paragraph 9-107.2(b) of the Armed Services Procurement Regulation. Subparagraph (b)(1) is quoted below:

"(b)(1) The contractor agrees to and does hereby grant to the Government an irrevocable, nonexclusive, nontransferable, and royalty-free license to practice, and cause to be practiced by or for the U.S. Government, throughout the world, each subject invention in the manufacture, use, and disposition according to law, of any article or material, and in the use of any method. No license granted herein shall convey any right to the Government to manufacture, have manufactured, or use any subject invention for the purpose of providing services or supplies to the general public in competition with the contractor or the contractor's commercial licensees in the licensed fields."

After some discussion of the point, Mr. Bannerman concluded by making the following statement at page 665 of the transcript of the hearings:

"Mr. BANNERMAN. Mr. Chairman, I think we understand each other on this point. I think there is, perhaps, some disagreement as to what the clause means.

"Certainly we will be glad to review the clause, and if we find the same vagueness in it, we will change it.

"On the other hand, if we feel, after review, that we are very confident in what it means, we will be glad to provide the committee with a memorandum of law on that subject, if it would be helpful."

The Office of General Counsel of the Department of Defense has submitted an opinion which is forwarded for your convenience. The legal interpretation, with respect to the second sentence of the subparagraph quoted above, is set

forth at the bottom of page 1 and continues through the top of page 2. This opinion confirms our understanding on what was intended by the second sentence of the clause.

Sincerely yours,

G. C. BANNERMAN,
Director for Procurement Policy.

DEPARTMENT OF DEFENSE,
OFFICE OF GENERAL COUNSEL,
Washington, D.C., January 18, 1960.

Memorandum for the Director, Procurement Policy, OASD (Supply and Logistics).

Subject: Restricts contained in the second sentence of subparagraph (b)(1) of the patent rights clause in ASPR 9–107.2(b).

You have requested our opinion as to the meaning of the second sentence of subparagraph (b)(1) of the patent rights clause which is required under paragraph 9–107.2(b) of the armed services procurement regulation (ASPR) to be inserted in any contract of the Department of Defense having experimental, developmental, or research work as one of its purposes.

It should be stated at the outset that the sentence in question has appeared in the prescribed patent rights clause since the issuance of the first ASPR in 1949. It had previously been approved as standard policy in the military department procurement regulations of 1947 in substantially its present form. When the ASPR patent rights clauses were reviewed by the Patent Policy Review Board in 1952 and by the ASPR special working group in 1953–55, no changes to the sentence were recommended. No controversy with respect to the sentence has been raised by industry to our knowledge, and no case has been found dealing with it.

The subparagraph in question reads as follows:

"(b)(1) The contractor agrees to and does hereby grant to the Government an irrevocable, nonexclusive, nontransferable, and royalty-free license to practice, and cause to be practiced by or for the U.S. Government, throughout the world, each subject invention in the manufacture, use, and disposition according to law, of any article or material, and in the use of any method. No license granted herein shall convey any right to the Government to manufacture, have manufactured, or use any subject invention for the purpose of providing services or supplies to the general public in competition with the contractor or the contractor's commercial licenses in the licensed fields."

For the reasons hereinafter set forth in detail, it is our opinion that the second sentence as it presently stands does not prohibit the Government from using the referenced subject inventions in any manner and for any purpose authorized by Congress. The question the sentence presents for legal determination is whether for certain uses of the inventions the Government would be obligated to pay additional compensation to the patent owner or whether for such uses is may avail itself of the royalty-free license granted under the first sentence. Further, it is our opinion that the subparagraph as a whole permits the Government to practice the inventions royalty-free for any purpose, including its traditional services to the general public when the contract is entered into in aid of such functions, aside from business rivalry for profit in the commercial market.

Under the provisions of title 28, United States Code, section 1498, any patented invention may be used or manufactured by or for the United States without license of the patent owner, subject only to payment of reasonable compensation—established if necessery in the Court of Claims—to the patent owner for such use or manufacture. The Supreme Court has construed this law as fully and adequately providing "for the exercise of the power of eminent domain" with respect to inventions patented in the United States. *Crozier* v. *Krupp*, (224 U.S. 290, 307 (1911)). Whatever considerations of policy may affect the exercise of this governmental power of infringement, no legal restrictions other than the requirement of reasonable compensation are imposed on it. When the Government obtains a license to use a patented invention it is protected from further claims for compensation to the extent of the rights granted. The Government would nevertheless be obligated to pay further compensation for any infringing use beyond the terms of such license. See Ellis, "Patent Licenses," section 373 (Deller ed., 1958). The practical effect, therefore, of a restriction on license rights granted the Government would appear to be merely to entitle the

patent owner to demand further payment for those uses which are determined in accordance with section 1498 supra to exceed the terms of the license.

It is clear that the restrictive language of the second sentence of subparagraph (b) (1) supra, bearing as it does on the scope of the license grant, cannot properly be construed as a contractual commitment by the Government not to compete, since it does not affect the Government's statutory power of use, which does not derive from the license grant. Accordingly, the Government would be liable to pay only additional compensation to the contractor if it manufactures, has manufactured, or uses subject inventions covered by contracts containing subparagraph (b) (1) "for the purpose of providing services and supplies to the general public in competition with the contractor or the contractors' commercial licenses in the licensed fields." Since no statutory or other technical usage is involved, there is no reason why the word "competition" in the quoted phrase should not be given its plain and normal meaning in accordance with the basic rules of interpretation of written contracts (Restatement, Contracts, section 235 (a) (1932)). Competition in the context of providing services and supplies to the general public implies business rivalry, "the play of contending forces ordinarily engendered by an honest desire for gain," *U.S.* v. *American Linseed Oil Co.* (262 U.S. 371, 388 (1922)). Competition has also been defined as the "effort of two or more parties, acting independently, to secure the custom of a third party by the offer of the most favorable terms. It is the struggle between rivals for the same trade at the same time; the act of seeking or endeavoring to gain what another is endeavoring to gain at the same time" (citing Webster's Dictionary and 12 C.J. 237). *Lipson* v. *Socony Vacuum Corporation* (87 F. 2d 265, 270 (1st Cir. 1937). Applying these definitions, the quoted language would appear to mean that the Government will not have the benefit of its royalty-free license if it seeks to use a subject invention in business rivalry with the contractor in the commercial market with the aim of obtaining the trade of the public at the expense of the contractor and realizing a profit thereby. The weight of the restriction may be judged by the relative remoteness of this contingency.

Further, under the basic rules of legal interpretation, the restrictive language of the second sentence of subparagraph (b) (1) must be interpreted in relation with the first sentence, which is the basic grant of broad license rights, so as to give reasonable meaning to both sentences and effectuate the main purpose of the contract (3 Williston, Contracts, secs. 618, 619 (rev. ed. 1936)). The restriction imposed by the second sentence, in the absence of clear indications to the contrary, should not be interpreted so as to nullify the affirmative license grant, which must be considered as intended to convey real rights and not illusory ones. Thus, where a governmental function, even one of service to the public for fees, is well established, and a research contract is entered into in aid of that function it would seem proper to conclude that the parties did not comprehend within the meaning of "competition" the exercise of that specific function. More explicit language with respect to "competition" would seem necessary to support a holding that the license rights conveyed under such a contract were not intended to be sufficient to permit the practice of a subject invention in carrying out that function without further payment. What does seem intended by the restriction is that the Government may not enjoy royalty free rights in such competitive activities against the contractor or the contractor's licensees as were not within the main purpose of the contract at the time the contract was written. If close cases should ever arise under the latter conditions, there might be room to consider the effect of such secondary rules of interpretation as construing language most strongly against the party using it or construing license restrictions in favor of the licensee.

This view seems entirely consistent with the apparent purpose of the division of rights provided in subparagraph (b) (1), which while granting to the Government a broad license in a subject invention, purports to reserve title to the invention in the contractor. The potential value of exclusive rights in areas outside known governmental activities would seem to be one inducement, presumably reflected in the consideration, which might otherwise be higher, for taking and performing the contract. The value of such rights would naturally be questionable were the Government, with the power in its license to have anyone practice the invention on its behalf, including dispositions (e.g., sales) authorized by law, able to engage royalty free at some later time in rival commercial activities which would place the contractor and his licensees at a commercial disadvantage. Since under the first sentence of subparagraph (b) (1) the Government's license is unrestricted, except for being nontransferable, the

contractor would understandably seek some restriction to protect the value of his potential patent rights in the commercial sphere, without defeating the Government's basic license powers in aid of its own traditional functions.

It is pertinent that during the Second World War many patent rights clauses in War and Navy Department contracts expressly limited the Government's license to "governmental purposes." This was done, according to the report of the Attorney General of 1947, "to meet objections of industry based upon the fear that the Government might itself go into business" (2 Investigation of Government Patent Practices and Policies 300, 468 (1947)). Another form of the limitation was "military, naval, or national defense purposes." New regulations were issued in 1945 which prohibited limiting the Government's license rights by contract "to any particular governmental purpose" without approval at the departmental level. Before 1947 however the forerunner of the present restrictive sentence was requested by several important contractors out of fear that the Government might attempt to socialize industry or take over more and more functions of providing service to the public. Initially approved as a deviation from the 1945 policy, the sentence appeared in the Army procurement regulations of 1947 as part of the standard patent rights clause. In 1949 the first ASPR included the sentence in its present form. It would seem, therefore, that the restriction on competition took the place of the limitation to "governmental purposes", as a more precise expression of what research contractors wished to guard against without further payment.

JACK L. STEMPLER,
Assistant General Counsel (Logistics).

Senator LONG. Well, thank you very much, gentlemen. It has been very enlightening to have you up here this morning, and I appreciate all the information you have provided us, and I hope you will provide us with the additional things I have requested.

(The prepared statement of Mr. Falvey follows:)

PREPARED STATEMENT OF JAMES P. FALVEY, DEPUTY ASSISTANT SECRETARY OF DEFENSE (SUPPLY AND LOGISTICS)

Mr. CHAIRMAN: I am James P. Falvey, Deputy Assistant Secretary of Defense (Supply and Logistics). I appreciate your invitation to appear and discuss Department of Defense policies on patents and on the acquisition and dissemination of data. For the convenience of the committee I will divide my statement into these major topics: what our patent policy is, how it came to be, why it is what it is; then what our data policy is, and why; and finally, our views on the pertinence of these policies to small business and the problem now before this subcommittee.

The Department of Defense patent policy is set forth in the armed services procurement regulation (ASPR), especially in our patent clause. First, we do not acquire any patent rights in a contract calling solely for the delivery of supplies. Secured, in any contract having experimental, developmental, or research work as one of its purposes, the Government receives a royalty-free, nonexclusive license to use any invention conceived or first actually reduced to practice in the course of performing the contract work. This license means that the Government has the right to have any manufacturer it chooses produce the patented article for the use of the Government without payment of royalties to the patent holder.

The contract clause prescribed by ASPR defines the obligation of the contractor and the rights of the Government. Generally, the contractor retains title to the patent and the right to collect royalties on all commercial business. The Government receives a royalty-free right to use the invention. Specifically, the clause requires a disclosure of inventions, conceived or first actually reduced to practice in the performance of contract work; a statement as to patents applied for or to be applied for; and the grant of a license to the Government of a royalty-free license to practice by or for the U.S. Government throughout the world in each invention. If the contractor has elected not to file a patent application claiming such invention, the contractor, upon the request of the contracting officer, must convey all his right, title, and interest in such invention to the Government. Hence, the Government may acquire title to inventions originated in the performance of contract work for the Department of Defense in this manner. This is done for defensive purposes only.

With respect to foreign rights, the contract clause provides that the contractor has the exclusive right to file for foreign patents within 9 months from the date of the filing of the U.S. application. The Government may request conveyance of the contractor's entire rights, title, and interest in inventions in each foreign country in which an application has not been filed within the time specified, subject to a reservation of a nonexclusive and royalty-free license to the contractor with the right of the contractor to grant sublicenses.

All subcontractors are required to convey similar rights to the Government or the prime contractor must seek a waiver of that requirement from the contracting officer. In the event that the waiver is not granted, the prime contractor may not proceed with that particular subcontract.

Where work under the contract is to be performed outside the United States, the contractor is also required to disclose inventions. He has the exclusive right to file applications on such invention within 9 months after the date of disclosure to the contracting officer. The U.S. Government shall receive the same type of license as in the domestic case with respect to any patent issued.

I would like to make it clear that if at any time the Department determines that title to any particular invention should not be allowed to remain in private hands, we have the flexibility to contract for the reservation of title in the Government. However, to do so would be a departure from policy.

To repeat, our general policy as expressed in our patent clause is to require disclosure of all inventions, a statement of election by the contractor as to whether he has filed or intends to file a patent application thereon, license to the Government with the right reserved to the Government to acquire all rights in the invention if the contractor elects not to file and the Government has determined that it is worthwhile to file a patent for its protection.

I think the committee would be interested in knowing that we now hold title to active patents in approximately 5,500 inventions as of June 30, 1959.

Historically, the patent policy of the Department of Defense was and is the result of operating experience of the Department and the military departments prior to the establishment of the Department of Defense. Section IX of the ASPR, which covers patent and copyright matters and technical data, was the first uniform statement of general policy on the subject that covered all military services. It was promulgated on July 1, 1949, and incorporated the principles which the military departments had found through their experience to be most workable and effective to meet their needs.

There has been only one major revision to the patent policy of the Department of Defense as set forth in section IX. This came about after exhaustive consideration by an Armed Services Patent Policy Review Board in 1952 and an extensive review and coordination within the military departments, the ASPR committee, industry, and special consultants. The revision was issued on January 4, 1955. The principal changes were to correct certain features of the former policy that had proved through experience to be undesirable. For example, the revision eliminated the statement of conditions under which the contracting officer should make a determination whether the Department of Defense should acquire title to inventions. This change does not prevent the Department from obtaining a title, but has the effect of requiring that the affirmative decision to take title be determined at departmental level rather than at the contracting officer level. Other changes included prohibiting the negotiation for background patent rights if the invention had been reduced to practice as an incident to procurement of supplies. It also eliminated technical data from the operation of the patent rights clause and made it a subject for separate treatment.

In short, the changes moved farther from the title concept to the license concept. Our experience under the present policy has been good and no changes of concept are needed to satisfy Department of Defense requirements.

The foregoing formulation and evolution of policy was influenced by the reports of various commissions, presidential and congressional studies, and boards within the Department. The divergent views as to rights in inventions arising out of Government-sponsored research have existed for a number of years. The statements below represent the two sides to the question.

The Report of the Attorney General to the President on Patent Policies and Practices of Government and Agencies Relating to Inventions of Their Employees and Contractors (1947). This report stated at page 76:

"Recommendations of Attorney General: 1. As a basic policy, all contracts for research and development work financed with Federal funds should contain a

stipulation providing that the Government shall be entitled to all rights to inventions produced in the performance of the contract."

The Second Report of the National Patent Planning Commission (1944) at page 24 made the following recommendation:

"It has been urged with considerable theoretical justification that there should be a uniform patent clause in all Government research and development contracts. The Commission has concluded that a single uniform practice would be unfeasible and undesirable from the standpoint of the Government. The ownership of inventions resulting from such contracts cannot be fairly determined by an arbitrary or fixed rule but should be established in each situation in accordance with the applicable circumstances. The Commission believes, however, that, since the Government has no need of the right to exclude conferred by a patent and does not enter into ordinary commercial enterprises in competition with its citizens, full ownership of patent should not ordinarily be asserted by the Government. An exception to this policy would be the situation in which private ownership of the patents would conflict with national interest. In those cases in which the Government does not acquire ownership of the patents, it should ordinarily receive as a minimum a royalty-free license. All negotiations in connection with research and development contracts, as well as the drafting of the contracts themselves, should be performed as now, by the agencies involved."

All elements of the Department of Defense have opposed legislation or any administrative requirements which would tend to impose the title theory upon the research and development and contracting provisions of the Department of Defense. On every occasion in which the matter has been under consideration, strong opposition has been voiced by the Secretaries of Defense, Army, Navy, and Air Force. Kenneth C. Royall, while Acting Secretary of War, in a letter dated January 27, 1947, to the President pertaining to the title theory advocated by the Attorney General's report, stated:

"* * * I am satisfied that adoption of the recommendations would wreck the War Department's research and development program."

Secretary of the Army Frank Pace, Jr., in a letter dated July 25, 1951, to the Director of the Bureau of the Budget, in commenting on injecting the title theory into a Senate bill, stated:

"The enactment of S. 323 including such provisions relating to inventions and patents as recommended by the Department of Justice would seriously impede and cripple the armed services research and development program."

James Forrestal, in a letter to the President dated January 29, 1947, while Mr. Forrestal was Secretary of the Navy, speaking in opposition to the title theory, stated:

"This would create dangerous rigidity which would certainly impede and might altogether imperil the prosecution of a vigorous and effective research and development program. * * * Actually, in my considered view, as I have already stated, we are dealing not with a bare possibility but with an extreme probability that serious harm would follow."

Mr. C. E. Wilson, while Secretary of Defense, submitted the following statement to the Subcommittee of Committee on Appropriations, House of Representatives, during February 1956:

"It is fair for the Government to receive from its research programs only a royalty free nonexclusive license with respect to inventions conceived or first actually reduced to practice under our research and development contracts, and to permit the research and development contractor to retain title to the patent and the right to collect royalties on all commercial production. The principal reason for believing that the above is fair grows out of the fact that the Government is accorded all of the rights which it needs, i.e., to use itself or to authorize its contractors to so use. It follows that acquisition of the complete title would mean obtaining more rights than the Government needs.

"It is right for the research company to share, since:

"(a) It is the best incentive to our contractors to invent. As a matter of interest this incentive is recognized within a large segment of industry wherein the concerns have entered into employment agreements with their scientists and engineers under which they either share the results or even permit the employees to retain commercial rights. Under these circumstances, the incentive would be for the employee-inventor to work on those projects which offer a potential return to him and to disregard governmental work if these did not offer that potential return.

"(b) Experience over a number of years leads to the strong conclusion that the research organizations of industrial organizations are not available for hire at all, but if they could be made available, the Department of Defense could not, within existing appropriations levels, possibly pay the costs of doing business on that basis. In short, adoption of the full title concept would wreck our research and development program. The importance of that program is well known to this committee.

"The remaining question of interest to this committee is what would the Government do with the greater rights than it needs if it acquired them. Among the avenues available are, first, it could embark upon the business of licensing the rights to commercial users for fees. Aside from the apparent problem of which user should the DOD license, and upon what terms, the end result is for the Government to project itself wrongfully into the industrial field. Secondly, a license could be granted to any person who requests it. This is not desirable since an invention to be valuable requires commercial exploitation. Licensees would be reluctant to invest the necessary capital unless assured of an exclusive position with respect to the items. Thus, full Government ownership of patents would have the ultimate effect of removing the patent from commercial usage."

Thus the Department of Defense patent policy is a considered distillation and refinement of years of operating experience. The important factors which are embodied in the policy are as follows. The mission of the Department of Defense is the defense of the United States. Thus, the Armed Forces must be provided with weapons which incorporate the most advanced technology. In order to obtain such weapons, it is necessary to compete with the demands of the civilian market for the scientific, technological, and engineering resources of American industry because we depend upon industry to produce the weapons we need. What are the motives of industry in assembling these resources? It is necessary to be realistic about this. Industry is in research to design and create products to sell. Research must have a production line payoff in industry. If industry lost its hope of the commercial market through a requirement that title to the inventions resulting from Government work be vested in the Government, our ability to secure the services of qualified and competent firms would be impaired. Since we must compete successfully for the scientific resources of industry, we must provide all of the incentive consistent with national interest. Our patent policy is a part of that incentive.

At the same time, our policy is aimed at protecting the interest of the United States. In determining the question of the division of patent rights resulting from research and development financed by the Department, we find our only need for patent rights is for a license to use the patented invention and so we will not have to pay twice. We buy only that which we need. This gives effect to the historical and traditional policy that the Government does not engage in commercial enterprises in competition with its citizens. It would be a waste of time, energy, and money for the Armed Services in their contracting to require rights, which, if obtained, would not be used.

I now wish to turn to a discussion of the acquisition and use of technical data.

The Department of Defense policy on the acquisition of data is set forth in part 2 of section IX of ASPR. Our policy on the acquisition of data is to encourage inventiveness and to provide incentive therefor by honoring "proprietary data" resulting from private developments and hence to limit demands for data to that which is essential for Government purposes.

In a contract which has as one of its principal purposes experimental, developmental, or research work, and calls for models of equipment or practical processes, the contractor is required to furnish for the price of the work all data resulting directly from the performance of the contract whether or not it would otherwise be "proprietary data." The contractor is required to furnish all data necessary for reproduction or manufacture of the equipment or performance of the process which is developed.

Data is not required for standard commercial items provided the contractor identifies the source and characteristic of such items. Nor is "proprietary data" required for items including minor modifications which were previously developed at private expense and have been offered for sale, provided the contractor identifies these items and the "proprietary data" pertaining thereto which is necessary to enable the reproduction or manufacture of the item or performance of the processes. The one situation where a contractor may be compensated separately

for use of "proprietary data" occurs when the contractor asserts and it is determined in the negotiation preceding the execution of the contract that such previously developed "proprietary data" is necessary for the product called for in the contract in which case payment may be made for the use of such data if the contractor so requests.

In supply contracts and subcontracts thereunder, "proprietary data," if obtained, is subject to specific negotiation for such data, and the data will be listed as a contract item. If data in this instance is obtained, the Government's rights to use depend on whether it is to establish additional sources of supply. In that case, it is obtained without limitation as to its use. However, if it is obtained for a limited purpose such as emergency manufacture, it is obtained subject to limitation as to its use.

The need for "proprietary data" to establish additional sources of supply arises when it is necessary to insure fulfillment of current and mobilization requirements or to establish competitive sources to avoid unreasonable prices. If neither of these conditions is present, the contracting officer is free to make repetitive purchases of equipment from the original developer. This policy honors the "proprietary data" developed at the expense of the contractor and gives effect to our policy of fostering private development of items having military usefulness. It is considered unethical to make the delivery of privately developed manufacturing trade secrets a condition to the obtaining of a Government contract.

The cost of acquiring "proprietary data" is difficult to derive. It is safe to say, however, that it would include the recovery of the research, engineering, and development costs involved, plus the loss of profits from future sales by competitors.

Our policy with respect to subcontractors in this area is that the prime shall obtain from the subcontractor only that data which is needed to satisfy the contractural obligations of the prime contractor to the Government. Any data acquisition by the prime contractor over and above these requirements should be subject to the process of bargain and sale between the prime and the subcontractor, as in any other business transaction.

To conclude the subject of acquisition of data resulting from Department of Defense contracts, the policy seems to be fair to the Government and to the contractor. It is in the best interests of the United States to encourage the development of items at private expense and, accordingly, we wish to encourage this by honoring the data resulting from such endeavor.

The committee is properly concerned with the dissemination of technical information as more particularly stated by Senator Long in a press release, quoted below in pertinent part:

"Government policies have also been criticized for impeding the flow of vital technical information developed at Government expense, thereby slowing down our scientific progress.

"In view of the Soviet threat we must insure that essential scientific information is readily available to all sectors of our economy. At this crucial time we can ill afford the luxury of hiding significant technological advances in corporate closets."

We are in agreement with the statement as it relates to the need for dissemination of scientific and technical information.

Technical information embraces a spectrum which runs from simple instructions on how to use equipment, maintain it, and to manufauture it to the most learned treatises on scientific phenomena, human behavior patterns, and the social and applied sciences.

At the low end of this spectrum, operational and maintenance data is received pursuant to contract requirements as an end item to be delivered with the equipment. Generally, no real scientific purpose is advanced by dissemination of such information to the general public.

Manufacturing information is usd in future procurements and to that extent it is disseminated particularly through formally advertised procurements. It may be otherwise disseminated as in the manner of scientific treatises discussed later on.

The more advanced material is distributed or made available through the Library of Congress, the Office of Technical Services of the Department of Commerce, the Armed Services Technical Information Agency (ASTIA), and the National Science Foundation, to name a few of the sources.

An exhaustive outline of governmental policy on the subject is contained in the hearings before the Committee on Science and Astronautics, House of Representatives, 86th Congress, 1st session, dated May 25, 26, 28, June 2, and 17, 1959, and entitled "Dissemination of Scientific Information." The Department of Defense statement will be found on pages 43–47, and is recommended to the subcommittee's attention.

One of the pressing problems in the field is that so much information is available. What methods of recording, classification, communication, including machine techniques, are necessary to bring the information to those who need it is a matter presently under widespread investigation.

Unclassified information is available generally to the public; classified information is available, consistent with security requirements. Apart from security requirements, availability of copies, number of personnel to process requests, and nondisclosure of confidential submissions, technical information is available to the public. We have no basis to state whether technological advances are hidden in corporate closets; if they are, it is not pursuant to our policies.

The committee has requested an analysis of the economic effects of our patent policies, particularly in relation to concentration, competition, and small business. First, let it be repeated that our patent policy is to leave the title to the invention in the contractor with the Government receivinga royalty free license to use the invention.

Whether this contributes to economic concentration is a matter upon which there is a dearth of facts upon which to base an objective judgment. We have no objective judgment on the question. Any subjective judgment must recognize that concentration of economic power can result from many factors, such as good management, ability to control basic resources, and many others, including through patents a recognized legal monopoly. To identify the many elements and to assign such elements their relative weight falls outside the mission of the Department of Defense.

The problem itself is very complex. It is believed that data reflecting merely the dollar amount of contracts and the total business volume of contractors obtaining them does not accurately present the picture. Of importance in the analysis would be the proportion of dollars going to invention-producing activities as opposed to developmental costs; the nature of the inventions produced—whether basic innovations or simple improvements, whether potential commercially or useful only militarily; whether the policy of the patent holder toward licensees was restrictive or liberal; whether the Government was the chief user of the invention; and so on. There would also have to be a reasoned estimate of the real effect of patents in producing economic concentration.

Such a study as it relates to patent policies of Government agencies was established as Study Group 14, Government Contract Patent Policy, by the Chairman of the Task Force for Review of Government Procurement Policies and Procedures, with the Honorable Robert C. Watson, Commissioner of Patents, as Chairman. Because of the lack of meaningful facts in this field, negotiations are now being concluded to secure the help of the Patent, Trademark, and Copyright Foundation of the George Washington University.

In addition, there are the important long-range studies of Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, U.S. Senate, now in progress, which also seek answers to the problem.

In the committee's letter to the Department, reference is made to the Attorney General's report of 1956 to the effect that some Government agencies are liberal "in giving away patent rights."

The Department of Defense with its large research budget and its patent policy is among those so described. I wish to emphasize that in our view we do not "give away" patent rights. We do not bargain for title, so we do not have title to give back. We seek the best scientific and technological resources we can find and our research and development contracts must be awarded to the firms which have these resources. Our aim is to buy the most advanced technological equipment. That equipment is what we are paying for. It is not for patent rights which may or may not materialize. Patent rights are a byproduct, not an end product of the contract.

One contract from Defense will not provide compensation for taking all the inventiveness of a contractor. It is no compensation for the background talents, plant, and facilities that made invention possible.

With respect to effect of our patent policy on competition, we take into account that we are operating in economy which is based on a competitive free enterprise system. The patent system is an integral part of that system. We have considered how we should fit our treatment of the division of rights in inventions in such a system. It must be recognized that a U.S. patent is a legal monopoly. It rewards the inventor by giving him the power temporarily to exclude others from using the invention he patented. It gives him time and incentive to develop and market the invention, thus making it available for public use. In return, he must disclose it and the knowledge is made available to the public upon payment of 25 cents for a copy of any patent.

As I stated earlier, we have title to 5,500 patents in inventions. They are available to the public. Any reputable person or firm can, upon application, receive a royalty-free, nonexclusive and revocable license to practice or use the invention. Practically speaking, they can use it without permission and run no real risk of the Government suit for the infringement. We have no economic interest such as income from royalties to protect. We are not in the business of selling patent licenses; a license to a Government-owned patent is relatively worthless since it does not afford the recipient investment protection on the basis of a right to exclude others.

The competitive advantage resulting from inventiveness and ingenuity is lost when it is placed in the public domain. The right to exclude, considered to be an inducement and an incentive to dispose personnel and plant resources to the development and commercial exploitation of the invention is lost. Would this capital be so disposed if the innovator knew that anyone could copy the invention with impunity?

I am sure the committee would be interested in knowing the views of the Small Business Industry Advisory Committee to the Department of Defense. In October 1957 one of the members proposed that small business should be exempted from the requirement of the grant to the Government of a royalty-free license. The committee considered the question and on February 4, 1958, passed the resolution quoted below:

"That it is the sense of this committee that small business does not wish preferential treatment, but equitable treatment, as compared to big business.

"It is further resolved that with express regard to patent rights resulting from research and development contracts with the armed services, that it is recommended that the Department of Defense preserve its existing policy of taking royalty-free licenses on inventions conceived and reduced to practice at its expense but not including any background inventions conceived and reduced to practice by the contractor prior to receiving the research and development contract."

To conclude, I consider our patent policy is in the best interest of the United States. It is designed to provide the incentive for American industry to undertake the scientific and development work so sorely needed in our present and future weapons. If we are to forge ahead in this age of rapid technological development and resulting rapid obsolence, we must continue to recognize, respect, and encourage all the inventive genius which this Nation can muster.

I wish to recommend to the committee that in any situation where a Government agency must use the private industrial, scientific and technological resources of the United States that are organized for profit that such agency be allowed to fit itself in the patent system in a manner calculated to provide such organization with an incentive to seek Government contracts and once obtained to employ their best resources in the performance of contract. This is best done in our opinion by leaving the commercial rights with the contractor.

Senator LONG. We will resume here at 3 o'clock.

(Whereupon, at 1:15 p.m., a recess was taken until 3 p.m., the same day.)

AFTERNOON SESSION

Senator LONG. The committee will come to order.

Is Mr. Maclay here? We will call Mr. Maclay.

Will you summarize your statement, sir.

STATEMENT OF W. D. MACLAY, ASSISTANT ADMINISTRATOR, AGRICULTURAL RESEARCH SERVICE, DEPARTMENT OF AGRICULTURE; ACCOMPANIED BY S. P. LEJKO, ASSISTANT TO THE ADMINISTRATOR, AGRICULTURAL RESEARCH SERVICE; T. SEEGRIST AND R. HOFFMAN, OFFICE OF GENERAL COUNSEL, DEPARTMENT OF AGRICULTURE

Mr. MACLAY. Mr. Chairman and members of the subcommittee, I am W. D. Maclay, Assistant Administrator of the Agricultural Research Service, Department of Agriculture.

With me on my left is Mr. Stephen Lejko, Assistant to the Administrator of the Agricultural Research Service; and to my right, Mr. T. Seegrist, and Mr. R. Hoffman who are of the Office of General Counsel of the Department of Agriculture.

Mr. Chairman, you have received a letter from the Department stating its practices with regard to such patent rights.

Copies of this letter have been furnished to you with the intention that it constitute the formal statement of the position and practices of the Department of Agriculture on patent policies. (See p. 354 for prepared statement.)

Briefly, it is the uniform practice of this Department to have contractors assign the patent rights in their inventions to the Government.

Our research contracts are made under the authority of the Research and Marketing Act of 1946, Public Law 733, of the 79th Congress, which requires that the results of such research be made available to the public through dedication, assignment to Government or such other means as the Secretary of Agriculture shall determine.

Any patents resulting from applications filed by us on these inventions are freely accessible to the public on a royalty-free basis.

I would like to take a moment and elaborate one point regarding the free accessibility to the public of Government-held patents. Such free accessibility has at times resulted in a reluctance on the part of private industry to invest capital in their practice of inventions covered by Government-held patents for the reason that some inventions require further development to make them economically feasible, as well as requiring the usual costs of promotion, and that the results of such further development would be available to competitors.

This is true of inventions made by both Government employees and by contractors, and I am speaking now of the Department of Agriculture.

For this reason, the Department of Agriculture has in recent years favored legislation which would empower the Secretary of Agriculture to grant exclusive licenses where such course of action was deemed desirable to secure utilization of Government-owned inventions.

This concludes the summary of our statement, and we would be pleased to answer questions.

Senator LONG. When was that decision first arrived at that you were going to ask to be given the right to permit persons to have private patents on things that had been developed by the Department of Agriculture?

Mr. MACLAY. These would be exclusive licenses for a limited time, not patents.

Senator LONG. How long a time would you want?

Mr. MACLAY. I believe the time would be limited up to 5 years. Assistant Secretary Peterson testified, I believe, 2 years ago on that point on one of the bills which would expand utilization research. I think we have that statement here.

(Pertinent parts of the statement are as follows:)

EXHIBIT XIV

STATEMENT OF S. L. PETERSON, ASSISTANT SECRETARY OF AGRICULTURE [37a]

* * * We would now like to discuss our reasons for supporting the identical bills H.R. 13513 and H.R. 13605. These bills vest all authorities and responsibilities placed on the Department in the Secretary of Agriculture. This will permit the continued coordination of utilization research with all other agricultural research and thus enhance our opportunities to make progress in utilization research. In addition, these bills contain all the authorities in S. 4100 that would materially aid in the conduct of our utilization and other research. These are: * * *

Authority to grant exclusive licenses for limited periods for the use of Government patents to carry out trial commercialization of new crops or new uses for agricultural products. Many patents are issued year after year as the result of the Department's utilization research. These patents are assigned to the Secretary and are available for use, free of any licensing charge, by a competent organization desirous of operating under them. Under these circumstances many industrial organizations are reluctant to invest sizable sums in the developmental aspects of a new use or process covered by Government patent since they recognize that any other industrial organization can promptly take advantage of their experience and manufacture the same product. Were the Department able to grant an exclusive license for a limited period to a competent organization that is willing to undertake the expense of developmental studies on a Government invention, we believe the time when agricultural raw materials will be used for this purpose would be materially shortened.

The exclusive licensing would provide a limited means for partially compensating industrial organizations for the cost of developmental studies. * * *

Senator LONG. Does the law permit you to have any discretion about taking a patent right when you pay for the research? Does the present law permit you——

Mr. MACLAY. As far as our contracts are concerned it specifically states in the Research and Marketing Act that we take title to patents resulting from a contract for research.

Senator LONG. How long have you been with the Department?

Mr. MACLAY. Since 1940. In my present position only about 6 months.

Senator LONG. This recommendation to permit the exclusive licensing for 5 years, when was that recommendation made by the Department?

Mr. MACLAY. May I ask Mr. Lejko to comment on that?

Mr. LEJKO. Mr. Chairman, that proviso was included in a number of bills that have been pending during the 85th Congress. It is also included in a number of bills currently pending before the Congress.

Senator LONG. When was the first time you had any knowledge of that recommendation?

[37a] Statement presented Aug. 8, 1958, at a hearing before the House Committee on Agriculture, 85th Cong., 2d sess., on a number of bills concerned with increased industrial use of agricultural products.

Mr. LEJKO. About 1958. I do not have the reference to the first bill available readily. We will be glad to supply it for the record if you wish.[38]

Senator LONG. As I recall, this administration made a recommendation along similar lines when the atomic energy bill was before the Senate about 1953, or 1954, and it was bitterly opposed. It was not like your recommendation, but a provision for private patenting of atomic energy, which was bitterly opposed before the Senate at that time. The Senate would not go along with it, and the result, of course, is the present AEC law which requires the Government to take patents. My impression is that such recommendations may very well be a policy which has been passed down from the White House or Cabinet level, because we are seeing these recommendations showing up in different places. I am curious to know just where it originally came from.

Mr. LEJKO. Mr. Chairman, it was included in S. 4100, which passed the Senate last year (85th Cong., 2d sess.). Under subsection 4(j) of S. 4100, it reads as follows:

To grant exclusive licenses with or without payment of royalty for a fixed period of not to exceed five years for the use of patents under the control of the Department of Agriculture.

Senator LONG. Is it over in the House of Representatives now?

Mr. LEJKO. A bill comparable to that was passed during the 1st session of the 86th Congress, S. 690, which also contained that similar proviso.[39]

Senator LONG. Is there such a provision over on the House side now?

Mr. LEJKO. Yes, sir; it is.

Senator LONG. It passed the Senate?

Mr. LEJKO. It passed the Senate on July 27, 1959. An identical proviso was contained in the House-passed version of the bill on September 1, 1959.

Senator LONG. I did not know it was in there. This may have escaped the notice of other Senators, too.

On the whole, do you feel that putting inventions in the public domain has retarded their production or exploitation.

Mr. MACLAY. Our experience has shown that if the patent or the process or the product covered by the patent has sufficient promise it has been pretty well taken up.

I think there are many of our developments that are what might be called on the marginal level where, if we had authority to grant exclusive licenses for further development, it might be helpful to push them over the hump. Our ultimate objective is to use more farm crops.

Senator LONG. Of course, you and I agree that there is no prohibition whatever if anybody wants to do research at his own expense, but do you know that practically all corporations that hire somebody to do research for them require as a condition of that contract that the fruits of that research would belong to the corporation?

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[38] S. 4100, 85th Cong.

[39] S. 690, a bill to provide for the increased use of agricultural products, passed Senate July 27, 1959 (S. Rept. 193); passed house Sept. 1, 1959, with amended language of H.R. 8639 (as of the close of 1st sess., 86th Cong., bill awaiting conference).

Mr. MACLAY. That is correct; I am aware of that.

Senator LONG. Can you see the analogy to the U.S. Government where we have a country of 170 million stockholders, and who pay to have certain scientific research done? Would it not seem to be just as good a practice for us as it would be for a corporation to do it?

Mr. MACLAY. Yes, I think the Department has always had that practice. This additional authority that we are talking about is not turning over the patent to anyone. Rather it would give us a little flexibility to promote certain of our developments. We do not have this authority at present.

Senator LONG. How frequently has it happened that you have not been able to get the research done because of the inability to give the contractor exclusive rights?

Mr. MACLAY. I do not know that that has occurred with us at all. Our contracting, by the way, is very small. The Department in recent years has had on of the order of $1½ million to $2 million annually of research contracts.

Due to the high cost of development-type research we have placed most of those contracts for basic research at universities and research institutions.

Senator LONG. I might be in support of giving you that flexibility if you were going to get some money out of it, if you were going to charge some fees for it, and use that to do some more research, because I think it is a very fine thing, the research that you do.

Mr. MACLAY. I have seen in one of these bills where it would allow granting of these licenses royalty-free or to collect royalties, so it would seem to me there would be a certain amount of flexibility which we would have to further promote the use of agricultural products.

Senator LONG. Have you found, or do you know of, instances where there has not been the capital available to develop something because the person could not get exclusive rights?

Mr. MACLAY. No; I could not say or give you any specific cases because we have not had that authority, and so we have not really been up against it.

Mr. GORDON. Mr. Maclay would the Department have objection to a proviso to your request, that to be able to grant 5-year exclusive licenses, the Attorney General of the United States would make a decision as to whether the granting of such an exclusive license would contribute to monopoly?

Mr. MACLAY. I would not think there would be any objection.

Mr. ANSBERRY. Have you had any difficulty in placing your research contracts due to this patent policy?

Mr. MACLAY. Very little. There are certain universities that will not accept contracts because of our present patent authority. However, they are very much in the minority.

Mr. GORDON. When a patent is not used for commercial purposes, could it not be due to a possible lack of demand rather than——

Mr. MACLAY. I think many of our patents are of that type. The regional research laboratories which cover the utilization phase of agriculture obtain most of the patents. We get of the order of 60 to 80 a year. I recently furnished information to the O'Mahoney subcommittee in which we cited about 40 or 50 examples which had been commercialized to a considerable degree. I think that was out of a total of 1,000 or 1,200.

We have a policy that the patent people in our laboratories take a look at the published material, and if they think there is something patentable, we patent it. Many of those are not used.

Mr. GORDON. Do you actively try to promote the production of products on which the Department of Agriculture holds patents?

Mr. MACLAY. Yes. We actively try to produce new products or new processes to extend the use of agricultural products, and where those are patentable we take out patents on them.

Mr. GORDON. Do you think a monopoly position which an exclusive license grants, say, for a 5-year period, is essential in inducing investment? Don't you think that if there appears to be a demand for a particular commodity in the commercial market, that a producer would certainly start manufacturing it even if he does not have an exclusive license?

Mr. MACLAY. I think there are degrees of that. I might say that there are many findings from our research that look very good, and a number of people will take the risk and go in and start development work. There are others that may be marginal, and if we had this flexibility, it would be helpful. I think each case would have to be taken on its own merits to see how it might contribute to the solution or to the attainment of our overall objective.

For example: the patent on frozen orange juice concentrate which was developed cooperatively by the Department and the Florida Citrus Commission has had wide use.

I believe this development returned to the farmer in the 1958–59 season something like $120 million for oranges that were processed into frozen orange concentrate. The use of this process developed very rapidly, and I do not believe that the Department's patent policy slowed down development.

Mr. ANSBERRY. Have you any other cases similar to the frozen orange juice?

Mr. MACLAY. There is another excellent one. The patent on the method of applying insecticides, with an Aerosol dispenser was originated in the Department in 1943 and it holds the patents. That has grown to where something like 250 products are being applied by the Aerosol method, all the way from insecticides to shaving cream.

The latest figures for 1958 showed 500 million of those containers were used in products, with a value or about $600 million.

About 125 U.S. companies applied for licenses for the Aerosol development, and that way of dispersing various products. Its use may have been slowed down, but it is widely used.

Mr. ANSBERRY. Do your available figures readily show the cost to the Government in developing those 2 patents?

Mr. MACLAY. Yes, we could make estimates. I do not have the one on the Aerosol development [40] but the work on the frozen orange concentrate for salaries and expenses was estimated at $70,000.

Mr. STULTS. You do not get royalties on either concentrate or on any of these products?

Mr. MACLAY. No, sir. Those are all royalty-free. They merely apply for licenses, and anyone that is considered reputable in the field obtains a royalty-free license.

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[40] The figure subsequently supplied by Mr. Maclay was $90,000.

Mr. STULTS. Do you feel that the public interest would have been served if you had given, let us say, Minute Maid a 5-year exclusive license to use the orange concentrate?

Mr. MACLAY. No, I think it is only in those cases where no one is apt to take up those things that you might be able to put over the top with additional incentive.

Mr. STULTS. If you are empowered to issue exclusive licenses, isn't there a danger that businessmen may say: "We don't want to touch it. We know that you can give us an exclusive license, so, therefore, we won't do it unless you give us an exclusive."

Mr. MACLAY. No, I think you would have to take individual cases. But I would think in the case of frozen orange concentrate, penicillin and the Aerosol, those are very obvious ones that they really click just like that.

Mr. STULTS. Thank you.

Senator LONG. Would you give us a few examples of some of the things that have been done to help Louisiana in the way of——

Mr. MACLAY. I might give you some instances. These have not been done by contract. You see, our contracting is very, very small. Take, for instance, a case like the frozen orange concentrate that was done in our own laboratory—that was not done by contractors, but we have the same policy on contracts as we do on all of our research.

Senator LONG. Right.

Mr. MACLAY. We have here 24 patents or those in process that have resulted from contract research.

Senator LONG. You do a fair amount of your own research then, I take it?

Mr. MACLAY. Yes. The total agricultural research figure for 1959 was $89,644,000; the contract research was of an order of $2 million. It is a very small part of the Department of Agriculture research effort.

Mr. GORDON. Will you submit for the record—I do not mean now but within the next week or so—what the results of your research on sugarcane, rice, and cotton and how it has helped the farmer, the farm-product processor, the farm machinery manufacturer, and the consumer?

Mr. MACLAY. I will be glad to do that.

(Information subsequently supplied by Mr. Maclay:)

EXHIBIT XV

USDA RESEARCH DEVELOPMENTS ON COTTON, SUGARCANE, AND RICE, OF BENEFIT TO LOUISIANA AGRICULTURE

COTTON

Researches conducted by the Agricultural Research Service and the Agricultural Marketing Service of the Department in collaboration with the Agricultural Experiment Stations of Louisiana and neighboring States, the cotton and cottonseed processing industries, and marketing organizations have been effective in keeping cotton, sugarcane, and rice important crops in Louisiana. The following are selected examples of research developments which have benefited the producer, processor, merchant, and consumer.

Fiber quality and genetics research formed useful guidelines for developing Louisiana's superior variety, Stardel. Knowledge and seed stocks are available for further improvements such as freeing the seed from the toxic substance

gossypol and the leaf from hairs that make it difficult to remove leaf trash during ginning.

Disease control research has led to stand improvement. About 65 percent of the planting seed in Louisiana now are treated with a fungicide. Seed stocks are available for further reducing disease hazards to production by breeding for resistance to verticillium and fusarium wilts and bacterial blight.

Defoliation research has resulted in an estimated 178,000 acres of Louisiana's cotton acres being treated with harvest aid chemicals, according to the latest estimates available.

Insect control research has been conducted in Louisiana by the Department since 1909 and has provided control measures for boll weevils and other insects. These measures have enabled growers to prevent devastating losses. Present research is directed to overcoming the resistance that the boll weevil and other insects are developing to currently used insecticides.

Weed research scientists have developed efficient chemical and cultural methods for control of weeds in cotton at an approximate saving of $5 per acre. In 1959, it is estimated that about 100,000 acres were treated in Louisiana, resulting in a saving of $500,000 to the cotton producers in the State.

Agricultural engineering research has led to improvements in mechanized culture and harvesting equipment and methods of operation. Ginning research has resulted in developing equipment and procedures for cleaning mechanically harvested cotton, for more efficient ginning operations, and for reducing damage to the fiber during ginning operations.

A new opening-cleaning machine for use in textile mills was developed and is in commercial use. Compared with previously available equipment, the new opener-cleaner has about doubled the cleaning efficiency and causes only half the fiber loss, with the result that more efficient use is being made of low grade mechanically harvested and handsnapped cotton.

Some 800,000 bales of cotton were used last year that would not have been used but for the development of the new wash-wear, wrinkle-resistant finishes. Fundamental research by the Department has provided valuable information for the commercial development of new and improved wash-wear finishes, and the Department has developed several improved finishes that have good commercial potential.

Cottonseed meal has been made suitable for broadened use as a high-protein supplement in swine and poultry rations. Previously, the presence of the pigment gossypol made the meal toxic to hogs and chickens. In cooperation with the National Cottonseed Products Association, State agricultural stations, and industry, techniques were developed to insure proper control during processing and to test the meal produced, so that a more nutritious product could be obtained. In recent years, nearly a quarter million tons of cottonseed meal—worth about $15 million—has gone annually into mixed feeds for broilers.

An efficient, versatile process for extracting oil from oilseeds has given small and medium size mills a means of lowering operating costs and increasing yields. Called filtration-extraction, the new process was first applied successfully to commercial production of oil and meal from cottonseed and soybeans, but it is also suitable for peanuts, flaxseed, sesame, castor beans, and rice bran.

Research has resulted in improved work methods and materials handling equipment for use in transporting and stacking bales in the warehouse and for unloading or loading bales from or onto road trucks and rail cars. It is known that a large number of compresses and warehouses have reduced their charges for basic services by 25 to 40 percent as a direct result of the adoption of the handling methods recommended. Roughly 15 to 20 percent of the cotton grown in the Mississippi Valley is produced in Louisiana.

Research was undertaken to provide quantitative measures of the effect of different ginning practices on the quality and use value of cotton and to develop practical guides to the profitable use of cleaning and conditioning equipment involving commercial mill tests to measure the effect of ginning practices on use value of cotton.

Another line of research undertaken to determine the effect of the use of lint cleaners on returns to farmers showed that the use of both one- and two-line cleaners generally resulted in substantial grade improvement, particularly for Bright or Light Spotted cotton.

In a recent study about men's preferences for fibers in selected clothing items, cotton was found to be the outstanding fabric for all but 2 of the 11 items studied. Similar results were reported for women's and girls' items of apparel, and such

results have been used for promotion. A special presentation to members of the textile industry which emphasized potentialities for increased fiber use in rainwear based on the results of a number of studies helped stimulate the increased use of cotton in the manufacture of rainwear.

SUGARCANE

The sugarcane industry in Louisiana was saved from destruction and returned to a favorable economic status by the use of disease-resistant varieties, developed through a carefully planned and efficiently executed basic and applied research program. Producers of sugarcane have probably received the greatest direct benefit from this valuable research. For example, in 1926 the average yield of cane per acre in Louisiana was 6.7 tons (total yield of sugar for the State was 47,166 tons). This crop failure was due to the devastating effect of mosaic, a virus disease that greatly reduced yields of susceptible varieties available at that time. Effective research provided mosaic-resistant varieties that gave prompt relief to this critical situation. In spite of numerous problems, continuous research since that date has produced superior varieties that are more resistant to diseases and low temperatures, and that are higher in quality. This has resulted in more efficient production and higher yields per acre. Approximately 30 years later, in 1957, the average yield of cane was 24.5 tons per acre (total yield of sugar was 397,000 tons). Losses from new diseases, such as the ratoon stunting disease, have been reduced by control methods developed through research.

Cooperative experiments with Louisiana Agricultural Experiment Station have resulted in the recent recommendation of endrin for the control of the sugarcane borer. This insecticide is much more effective than those formerly used. United States Department of Agriculture entomologists have developed an effective method of controlling soil arthropods attacking sugarcane. In heavily infested fields, yield increases of 6 tons per acre of cane may result when these pests are controlled.

The scarcity of labor in Louisiana during and following World War II presented a catastrophic problem to the sugarcane industry. Through research, varieties adapted to mechanized harvesting were developed and made available to the industry. Engineering research provided equipment for harvesting these erect-growing, lodging-resistant, uniform-maturing varieties, greatly reducing the labor requirement at harvest time. During recent years, equipment manufacturers have developed more efficient machinery capable of harvesting even lodged sugarcane, and a wide range of equipment for cultivating, fertilizing, and applying insecticides and herbicides to the crop; the sugarcane industry is highly mechanized at this time, providing an important source of income for manufacturers of equipment and at the same time, lowering the man-hour requirement for producing a ton of sugar.

The milling and processing qualities of new varieties of sugarcane need to be known for selecting those varieties most suitable for commercial production. Cooperative pilot-plant evaluation of juice extraction efficiency, clarification effectiveness, and sugar yields for new varieties are made with the Audubon Sugar Factory at Louisiana State University to give the sugarcane industry this necessary information.

Research has demonstrated that fresh cane delivered to sugar processing mills immediately after harvesting yields a higher percentage of recoverable sugar than cane left in the fields for varying lengths of time after cutting. On the 250,000 acres of cane harvested in Louisiana alone for sugar production, an estimate annual saving of $2.5 million has resulted from the average improvement in delivering cane to the mills 24 hours earlier than was the practice before results of this research were available.

At the request of, and in cooperation with the American Sugarcane League and the Louisiana Farm Bureau, research was initiated under contract with Louisiana State University to find more precise methods of sampling and laboratory analysis of sugarcane samples. Improved sampling and testing procedures will permit the use of price incentives for producers to use improved varieties and practices, and provide a more equitable basis for payments to producers. More efficient methods and equipment for sampling and testing will also reduce the cost of this operation to the raw sugar mills.

Research on the possibilities for increasing the market for bagasse points out that the most promising outlets are in the production of corrugating ma-

terial and pulp for blending with wood plup in the manufacture of fine, wrapping, bag, newsprint, and magazine papers, and of linerboard. It is reported that a small commercial paper mill has been operating for several years in southern Louisiana utilizing bagasse as one of its raw materials.

Three research reports on marketing molasses as a feed ingredient for livestock have been issued. The first, on livestock feed use, showed molasses prices to be lower than equivalent feeds in many areas. The second report dealt with methods, costs, and practices of molasses transport between producing areas and feed markets. The feed-mixing industry, as a potentially expandable market for molasses, was the subject of the third report. This research has materially aided in the development of feed markets for molasses, vitally needed because of the loss of the major industrial alcohol market for molasses to synthetic products.

RICE

All rice varieties grown in the United States were developed in cooperative Federal-State research projects in the country. For example: Rexoro is a long slender-grain variety that cooks dry and flaky. It is the leading variety that is parboiled. When treated in this manner, it is suitable for the canned products manufactured by several processors. Lacrosse and Gulfrose, medium-grain varieties developed in cooperative studies in the South, are resistant to the hoja blanca disease of rice. This disease was widespread in Louisiana in 1959. These varieties are being increased so they can be used to prevent widespread losses in case hoja blanca becomes epidemic. Nato, a medium-grain variety that resists lodging, responds well to fertilizer, produces excellent mill yields and meets the demands of a large segment of consumers and of processors of dry cereals. These varieties are adapted to modern methods of harvesting and handling by machines.

Rotation systems of rice and improved pastures have been developed by research thereby increasing the economy of rice production and the carrying capacity and beef yields of the pastures. Research on fertilizers for rice has established the best rate and ratio of fertilizer and the optimum time for application. Weeds that commonly infest rice fields can be controlled by using the methods and materials that have been developed by research.

Diseases that cause losses in yield and quality of rice now can be controlled by using methods developed through research. Specifically, seedling blight can be prevented by using fungicides and straighthead can be controlled by using the correct irrigation method or by growing a resistant variety. Research on hoja blanca, a virus disease, has revealed the vector and identified resistant varieties.

Research on rice field insects has resulted in the development of insecticidal control methods for the rice stinkbug which is the main cause of pecky rice. Savings in drainage and irrigation expense to the rice grower resulted when research by entomologists showed that in Louisiana damage to rice by the rice water weevil was negligible, and that spraying with insecticides or drainage to control this insect was not worthwhile.

Rice harvesting is now mechanized and research has established the correct time to harvest, optimum drying temperatures and moisture content for storage, and proper facilities and methods to control insects and retain quality in bulk stored rice.

There are varietal differences in the cooking and processing characteristics of rice. Research in this field has identified many of the physical and chemical characteristics that cause these differences so that breeding material can be tested in early generations.

New operating procedures for drying short-grain and medium-grain rices have been developed, and are being adopted by industry, which may increase income of growers and millers by several million dollars annually. By the new procedures, plant drying capacities can be increased 50 percent without loss of quality and operating costs substantially reduced. Increased drying capacity permits more rice to be dried at optimum maturity and thus avoids cracking of kernels caused by field drying after maturity.

Improved techniques for milling rice, applicable in present types of rice milling equipment, have been developed. The new procedures, being put into commercial practice, give increased yield of whole undamaged grain (head rice). Milled rice production may be enhanced as much as $2 million annually by the new practices.

Research on rice distribution patterns provides the rice industry for the first time with fundamental information on the characteristics of the domestic market for rice on a State-by-State and on an aggregate basis. It also has provided benchmarks for evaluating results of increased sales, educational, and promotional activities.

The prevention of insect damage to rice as it is stored in the gulf coast States is the subject of an extensive research effort. One phase of the research is the use of protective sprays and dusts for rough rice stored in bulk or in bags. It was found that malathion and synergized pyrethrum could be used in amounts effective in controlling insects without exceeding tolerances established for these insecticides.

A study of cost of operating 33 Southern rice mills (of which 14 were located in Louisiana) reveals that the larger the volume of rice milled the smaller the per unit cost of milling. Only small reductions in per unit cost were observed in mills which operated in excess of 1 million hundredweight of rough rice annually. The study was designed to provide basic information for the individual rice miller for possible use in cost reduction appraisal.

Senator LONG. Thank you so much.

(Prepared statement submitted by True D. Morse, Assistant Secretary of Agriculture, follows:)

PREPARED STATEMENT OF TRUE D. MORSE, ASSISTANT SECRETARY OF AGRICULTURE

DECEMBER 2, 1959.

HON. RUSSELL B. LONG,
Chairman, Subcommittee on Monopoly, Select Committee on Small Business, U.S. Senate.

DEAR SENATOR LONG: Reference is made to your letter of November 18, 1959, requesting a statement of this Department's patent policies, an analysis of the economic effects therefrom, and whatever recommendations we may consider appropriate.

From the third paragraph of your letter we presume that you are primarily concerned at this time with this Department's policies relating to patents which may result from Government-financed research contracts with private industry or with universities or private research organizations, rather than such policies relating to employee-made inventions.

Contracts for research by the Department of Agriculture are made under the authority of 7 U.S.C. 427, 427i, and 1621. Section 427i contains a provision that "Any contracts made pursuant to this authority shall contain requirements making the results of research and investigations available to the public through dedication, assignment to the Government, or such other means as the Secretary shall determine."

In accordance with the above-quoted provisions, the Department of Agriculture has consistently followed the practice of requiring a worldwide assignment to the Government of the patent rights in any inventions and patent applications arising from work carried out under research contracts.

As a result of the above-stated policy and practice, our contractors do not themselves apply for any patents on inventions made by them since they do not retain any proprietary rights in these inventions; but such patent applications have been made by the Department of Agriculture itself, with the worldwide patent rights assigned to the Government.

Any patents granted for such inventions are made available to the public under royalty-free nonexclusive licenses. This practice arises from an interpretation of an opinion by the Attorney General (24 Op. Atty. Gen. 320) that an exclusive license in a Government-owned patent may not be granted in the absence of statutory authority.

It is our view that, since research or developmental contracts entered into by the Federal Government are paid for with public funds, the benefits should accrue entirely to the public. In addition, any discovery resulting from such contracts should also belong to the public.

The nature of the research carried out by this Department, either in its own laboratories or in private laboratories under contract, is predominantly of a public service and utilization nature, as, for example, to discover new uses for agricultural products in contrast to the procurement type of research with which the defense agencies are concerned. A mere license to the Government

in any patent resulting from an invention or discovery made in the course of a research project of this Department would in most instances be a hollow gesture if the public itself did not have free access to the invention.

While the cost of the research might be reduced by permitting the Government to share in the royalties, we believe that it would actually tend to increase the cost to the public since the contractor who had title to the patent could well arrange to recover from the ultimate consumer the share of the royalties which he had paid to the Government.

For some years the Department has favored legislation to empower the Secretary of Agriculture to grant exclusive licenses for the use of patents under the control of the Department of Agriculture. While such proposal has not related expressly to the licensing of patents secured as a result of contract research, such patents were of course expected to be included. A provision for such exclusive licenses with a time limitation appeared as Section 9(b) of H.R. 8639, 86th Congress, 1st Session, which passed the House on September 1, 1959.

Experience has shown that in some instances further developmental work has to be conducted before an invention, even though patented, can be put in a form which is economically feasible. Under the policy of granting only nonexclusive licenses, as the interpretation of the above-mentioned Attorney General's opinion requires, some difficulty has at times been encountered in interesting the investment of private capital for the commercialization of patents under the control of this Department. It is therefore believed that if some provision were made for the protection of a private investor by means of an exclusive license, even if only for a limited time, whereby he would be assured of the absence of competition until he has carried out further developmental work and has established himself in the market, more interest would be awakened in Government-held patents.

In view of your request that this report be submitted by December 1 if possible, we have not obtained advice from the Bureau of the Budget on its submission.

Sincerely yours,

TRUE D. MORSE, *Assistant Secretary.*

Senator LONG. Mr. Banta, I am sorry to keep you waiting.

Mr. BANTA. That is all right, Senator.

STATEMENT OF PARKE M. BANTA, GENERAL COUNSEL, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE; ACCOMPANIED BY MANUEL B. HILLER, OFFICE OF GENERAL COUNSEL; AND ARTHUR H. BISSELL, OFFICE OF THE SURGEON GENERAL

Senator LONG. Will you please summarize your statement, sir.

Mr. BANTA. I am responding for the Secretary on this occasion, Senator Long, and I have filed a statement[41] with the committee in which an attempt has been made to set forth the patent policies of the Department of Health, Education, and Welfare, and explain in some detail our activity under them.

The statement points out that the Department patent policy is developed by the Department Patents Board composed of representatives of the various operating agencies of the Department, which Board is advisory to the Secretary.

Because of the activity of the Department in the field of research and development contracting being of more or less recent origin and comparatively limited, our experience under them is not susceptible at this time to accurate or significant appraisal.

It is explained that the bulk of the Department's research lies in the field of medical research by the Public Health Service.

This research is largely accomplished by a substantial number of grant programs in which the grants, appropriately conditioned, are

[41] Prepared statement, p. 361.

made to public and nonprofit agencies and individual members of the scientific community and under special circumstances to private firms. And, of course, we do, to a lesser degree, contract for research.

Consistent with the Department's statutory responsibility for the dissemination of information and making public the results of the research, this statement points out that it is the basic policy of the Department that the results of Department-financed research should be made widely, promptly, and freely available to other research workers and the general public.

This availability can usually be provided by dedication of a government-owned invention to the public by publication.

Copies of the pertinent regulations and the patent policy statement of the Secretary have been furnished to the committee.[42]

You will note two exceptions to our basic policy. In the grant and contract areas we have permitted grants to or contracts with nonprofit institutions to provide for the retention by the institutions of invention rights for disposition by them in accordance with the institution's established policies and procedures, where it is found that the invention will be made available without unreasonable restrictions or excessive royalties.

Of course, in every such case the Government reserves the irrevocable royalty free nonexclusive license.

The second exception is in the field of cancer chemotherapy industrial research contracts, and is permitted only because of the peculiar exigencies of this program, and in order that the resources of the pharmaceutical and chemical firms might be brought to bear with a minimum delay in exploring exhaustively and rapidly the potentialities of chemical compounds in the control and treatment of cancer.

Under the exception provided for by the Department's regulations, and more particularly set out in a policy statement by the Secretary, copies of which have been furnished to the committee,[42] the rights of inventions resulting from cancer chemotherapy industrial research contracts are left to the contractor, subject to the right reserved to the Department to nullify contractor's patent rights which they may have obtained if the invention is not made available in sufficient quantities or at a reasonable price or in a quality that is adequate.

To indicate our limited experience, it is pointed out in the statement that during the fiscal year 1958–59, the Public Health Service entered into a total of 227 research and development contracts, and less than 15 of which, 12, I think, would be exact—were cancer chemotherapy contracts which left invention rights to contractors pursuant to this exception.

I believe this sufficiently summarizes the statement relating to the Department's patent policies, and the extent of our contract experience.

Senator LONG. How much money do you spend a year on it? How much money a year do you spend on research?

Mr. BANTA. Well, last year the Public Health Service had approximately $400 million for research, and I think that was allocated $250 million probably for grants, and if that is the right amount for grants, then $150 million would have been available, for contracts and for our own operations in the research field.

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[42] see exhibit XVI, p. 364.

Senator LONG. $150 million for contracts?

Mr. BANTA. As Mr. Bissell, who sits to my left, points out, that too, would include the cost of our own direct research, so that contracts and our direct research costs would approximate the $150 million. The total amount which is obligated for contracted research is less than $30 million.

Senator LONG. Have you found that the fact that the contractor in most instances would not receive patent rights to that which would be developed has created any great difficulty in finding adequate contractors to do research for you?

Mr. BANTA. I do not think we have had any difficulty at all with the policy which we have promulgated, Senator.

It would certainly be quite minimal; there is no area with which I am familiar to indicate that we have had difficulty with application of the policy I have just mentioned.

Senator LONG. Your field is one in which people are more than ordinarily interested in serving mankind and, perhaps, less interested in the profit involved than most, I would take it?

Mr. BANTA. We could probably find people who would take issue with us about that, but we like to think that our field is largely in the area of doing something genuinely of value to the individual and to all individuals.

Senator LONG. You like to think it, whether it is true or not.

Mr. BANTA. Well, to us it is true. But I suspect there are those who would take some issue.

Senator LONG. Thank you very much, Mr. Banta. I will let counsel ask you the questions.

Mr. GORDON. The usual practice of your Department, as I understand it, is that it reserves the right to determine the ownership and disposition of any resulting invention resulting from research and development work sponsored by you, with the two exceptions.

Mr. BANTA. That is right.

Mr. GORDON. One of the two exceptions is a contract with nonprofit institutions, and I have some questions about this subject.

What is the reason for this exception? What would have been the consequence for not giving this exception even if the institutions demanded it?

Mr. BANTA. You have reference in these three questions, now, to the nonprofit institutions?

Mr. GORDON. That is right.

Mr. BANTA. I think the only reason is that it was an exception thought to be appropriate when the contracting unit of the Department could find that the patent policies of the institution were sufficiently comparable with the patent policies of the Department so as to lead the person making the decision to believe that the public would have the same general access to the invention under the policy of the institution as if we ourselves had retained the title.

Mr. GORDON. Do you have a contract provision which requires the prompt reporting of any invention resulting from research and development sponsored by you?

Mr. BANTA. Oh, yes.

Mr. GORDON. Do you have a contract provision which requires the prompt delivery of data to you?

Mr. BANTA. I think such a provision is contained in all of our contracts. We have access to the data and it is for the Department; we have access to the report. We require the report to contain all of the information and, of course, it is made to us and, therefore, it is our property. It may become the basis for a decision as to whether or not we would permit the inventor, in line with our policy, to have the title to the invention.

Mr. GORDON. Is there any provision by the Department for the prompt dissemination of new scientific knowledge?

Mr. BANTA. Yes.

Mr. GORDON. What is the reason for the cancer chemotherapy exception? What would have been the consequence of not having made this exception?

Mr. BANTA. I do not think I can answer your second question: Taking your questions in the inverse order of inquiry—I do not think I can tell you what would have been the consequences if we had not made the exception.

But, you know, it is very obvious that dealing with the industries, we found we were dealing with different institutions or organizations than when we dealt with nonprofit institutions, colleges and universities, and the people we were accustomed to dealing with in our grant program.

I do not know, but I suspect that the industries with which we dealt were in many instances accustomed to patent policies more liberal than our basic patent policy.

Maybe it is enough for me to say that we did not get any contracts for a considerable length of time, and I believe none under our basic policy, and that it may be those who are responsible for advising the Secretary. The Patents Board to which I have referred, determined that some modification of the basic policy would be in order, and that this exception would be acceptable and letting us get into the chemotherapy research program more promptly, and that was certainly one of the things we wanted to do.

Mr. GORDON. Mr. Banta, could you make inquiries and try to find out what the exact reasons are, and if it is possible we would very much like to know the companies, for the record, which did not——

Mr. BANTA. Well, of course, I am sure I can give you the names of all of the companies——

Mr. GORDON. Which did not take a contract.

Mr. BANTA (continuing). With which we have contracts.

Mr. GORDON. I mean the companies not with which you have contracts but who refused to take contracts to do research in the cancer field unless they got the patent rights.

Could you supply that for the record within the next week or so?

Mr. BANTA. I will promise you, Mr. Gordon, that I will take a look to see if the record anywhere in our Department discloses that information. If it does I will provide it.[43]

Mr. STULTS. Your testimony was that no company was willing to take such a contract, is that right?

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[43] Following is excerpt from letter dated Dec. 16, 1959, to the Senate Subcommittee on Monopoly, signed by Mr. Banta:

"I have made careful inquiry and I am told that there are no records in the Department (Health, Education, and Welfare) which disclose the name of any company or companies which refused to negotiate a cancer chemotherapy contract merely because of our basic patent policy."

Mr. BANTA. No, no. I said we did not get a contract. We did not get a contract.

Mr. STULTS. You did not get a proposal submitted?

Mr. BANTA. Under our basic policy—we got no contract under the basic policy.

Mr. STULTS. Your exception here was for speed. Do you know if there is any formal or informal arrangement whereby Company A with whom you have a contract, let us say, has made a certain breakthrough, and that Companies B, C, D, E, and F with whom you have contracts know the extent and the type of breakthrough in the cancer area? Or are they all behind closed doors holding their scrimmages behind the sealed stadiums?

Mr. BANTA. I don't know about that. Of course, our contracts require that inventions be reported to us.

Mr. STULTS. We have a question——

Mr. BANTA. I imagine you can tell me, Mr. Bissell; how many have been reported?

Mr. BISSELL. There have been no inventions reported under the cancer chemotherapy contracts.

Mr. STULTS. We could assume, however, that each of these companies would not consider it an invention until he had everybody 100 percent cured of cancer.

Mr. BANTA. I do not think we can. We reserve the right to march in anyway.

Mr. STULTS. Have you marched in on any of them yet?

Mr. BANTA. No, we have not. No invention having been reported to us, we have not marched in.

Mr. STULTS. I would not assume that because the invention has not been reported there has, in fact, been no invention.

Mr. BANTA. Under our policy we have reserved the right under all of the contracts, with all of the contractors, to look over their shoulders just to see what is going on.

Mr. HILLER. Ordinarily, sir, our contracts provide for the designation of a project officer whose responsibility is, as a matter of program, to maintain a very close liaison with the contractor, and this includes periodic visits with the contracting organization, tours through their plant to see exactly what is being done as a supplement to the formal progress reports that are submitted from time to time.

In this way we are kept apprised of what is being developed and the extent of any advances that are being made.

Mr. STULTS. Thank you, sir.

Mr. GORDON. Mr. Banta, do you scrutinize carefully what the contractor does with the invention, that is, if you do give away the title?

Mr. BANTA. Are you speaking now of the invention that might be made under one of these contracts?

Mr. GORDON. Yes. Do you have any provisions where you make sure that everything he does is in the public interest?

Mr. BANTA. Yes. We have a provision with a right reserved in the Public Health Service, for example, in the Surgeon General, to cancel out their right to use it, and to make—to grant sub-licenses himself in areas where he determines that it is not sufficiently available to serve the public interest either from the standpoint of quantity, quality or price.

Mr. GORDON. Incidentally, Mr. Banta, I noticed the provisions which enable you to do this.

Mr. BANTA. You mean in our regulations?

Mr. GORDON. This is in your regulations, and in your procedures. It is No. 4, "Failure to Meet Health Needs." If a company did not meet the requirements that you established, you would have a devil of a time getting the patent away from him or at least making him license somebody else.

Mr. BANTA. Are you referring to paragraph four, 4(a), entitled "Failure to Meet Health Needs"? (See p. 372.)

Mr. GORDON. That is right; sections small a., small b., and small c. of par. 4 of your regulation.

Mr. BANTA. Yes.

Mr. GORDON. That is quite a procedure, wouldn't you say?

Mr. BANTA. Yes, sir; I would. I would say it is some departure from procedure which I have found in other contracts.

Mr. GORDON. Is this kind of an exception to your policy, which, on the whole, I think, is very admirable, is this generally left to the determination of a contracting officer?

Mr. BANTA. Oh, no. It is for determination by the Surgeon General, and in our Department, as is pointed out, I think, in the statement which I filed,[44] we have a departmental patents board which is composed of responsible officials of the Department, representing such of its agencies as the Food and Drug Administration, the Office of Vocational Rehabilitation, the Office of Education, and the Office of the Secretary. We also have a patents officer who has certain review and advisory functions. We have a group of very competent advisers, therefore, to the Surgeon General and, in turn, to the Secretary in this field.

Mr. GORDON. If you licensed other companies, would they have to pay a royalty? Or are they royalty-free?

Mr. BANTA. Oh, no; they are all royalty-free. I think you will find in our statement on policy, too, all licenses are royalty-free, and they are all nonexclusive.

Mr. GORDON. How about an invention which comes under the chemotherapy exception? Suppose the company that gets the patent rights under this exception, licenses another company—company A gets the patent rights, company B is licensed. Company B would have to pay company A a royalty, wouldn't it?

Mr. BANTA. Well, that would be true certainly, but you understand our march-in clause is one which gives the Surgeon General the right to nullify this patent right, and the contractor's title to it, and all subcontractors, if there are subcontractors, in the event he finds that there are unreasonable restrictions of any kind, that the price is not reasonable or that the quality or quantity is inadequate. So, you see the Government is really in this respect in a position to require the same thing of the contractor that it would do if it owned the title, I am reasonably sure.

Mr. GORDON. This will be my last question, and this may have been asked before by the Senator.

As a result of dedicating an invention to the public, have you found a reluctance on the part of business in exploiting it?

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[44] Prepared statement of Mr. Banta, p. 361.

Mr. BANTA. I do not believe we have had any experience in that area. I am sure I would say, "no." The answer is no.

Mr. ANSBERRY. Have any significant discoveries come cut of your research program to date?

Mr. BANTA. Do you mean in our total research program or do you mean in our field of contracts?

Mr. ANSBERRY. In your entire research program.

Mr. BANTA. Oh, yes; in the entire research program.

Mr. ANSBERRY. Have any of them been developed commercially as yet?

Mr. BANTA. Yes, sir; some of them.

Mr. ANSBERRY. Can you give us some outstanding examples?

Mr. BANTA. Well, I guess the most, perhaps the most important, most recent one, is the NIH discovery of—it is known to me only by number—the number is 7519. It is a synthetic drug that is used as an analgesic and——

Mr. ANSBERRY. Is that the morphine substitute?

Mr. BANTA. Yes. Perhaps, by the layman it can be said to be a substitute for morphine.

Mr. ANSBERRY. With less deleterious side effects?

Mr. BANTA. Presumably.

Mr. ANSBERRY. Has that been developed commercially or is that solely an NIH product?

Mr. BANTA. Licenses have been issued by the Secretary to six firms, upon the recommendation of the Bureau of Narcotics although many more firms have indicated interest in the drug.

Senator LONG. I want to thank you very much.

(The prepared statement of Mr. Banta follows.)

PREPARED STATEMENT BY PARKE M. BANTA, GENERAL COUNSEL, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Mr. Chairman, and members of the committee, permit me to express the appreciation of Secretary Flemming for the invitation extended to him to appear before this committee and to inform you of the policies of this Department with respect to patent and invention rights. Secretary Flemming regrets his inability to respond in person to your invitation.

You no doubt know that the Department of Health, Education, and Welfare makes comparatively limited use of contracts in its research and development activities; with two exceptions hereinafter referred to, such contracts reserve to the Government the right to determine the ownership and disposition of any resulting invention and that to date only one invention under a research contract has been reported although we have been informally advised that two others will be reported in the near future. The one invention reported was made at a State university and it has now been dedicated through publication. (Incidentally the two inventions which we expect to be reported soon arose under a contract with a firm which is included on the "List of Small Companies for Research and Development Work" issued by the Small Business Administration in May 1958.)

One of the two exceptions noted above relates to research contracts with nonprofit institutions. When, after review of the patent policies and procedures of the institution, it has been determined that they are such as to reasonably assure that any inventions will be made available without unreasonable restrictions or excessive royalties, the contract may provide that inventions will be left to the institutions for disposition in accordance with its accepted policies (with such stipulations in the contract as may be deemed necessary in the public interest). We have made contracts with four universities under this exception. We have no reports of inventions having been made under these contracts.

The second exception relates to our cancer chemotherapy industrial research contract program, under which the research contracts may grant a conditional

right to the contractor to patent and exploit certain inventions arising under the contract. We have made contracts with a number of companies under this exception.

However, in any case where the contractor is permitted to retain invention rights, we reserve to the Government an irrevocable, royalty-free, nonexclusive license to practice the invention. In addition, in any case where a contractor is allowed to take title to an invention pursuant to the Department's patent policy in the administration of the cancer chemotherapy industrial research program, the Department reserves the right to license other companies or to dedicate the invention after complying with appropriate procedural safeguards, in the event that the contractor fails to meet the public need for the invention with respect to supply, quality, or price.

Having rather summarily highlighted certain aspects of the Department's policies as they affect patent rights resulting from Government financed contracts entered into by us, I believe it would be helpful for me to give you some more complete information about the nature of the patent policies of this Department and how they conform to the authority and responsibilities of the Department. Perhaps a brief statement regarding the Department's activities and responsibilities may be helpful as a backdrop to the discussion of its patent policies. As you may be aware the Department of Health, Education, and Welfare, having within its structure such agencies as the Food and Drug Administration, Social Security Administration, Public Health Service, Office of Vocational Rehabilitation, is primarily concerned with the well-being of the people of this Nation.

Keeping in mind our responsibilities and concern for the well-being of the public at large, as well as our statutory responsibilities for dissemination of information and making public the results of research, the Department has, over the years, formulated patent policies which are based on the position that the public interest will, in general, be best served if inventive advances resulting from its research activities be made freely available to the Government, to science, to industry, and to the general public. As early as 1949, the then Federal Security Administrator established an Agency Patents Policy Committee, under the chairmanship of Miss Mary E. Switzer, then assistant to the Administrator, now Director of the Office of Vocational Rehabilitation, to study the patent problems of the Agency and to formulate recommendations for an agencywide patent policy. Upon the issuance of Executive Order 10096 on January 23, 1950, the committee drafted an Agency order (FSA Order No. 110, July 10, 1950) setting forth the patent policy and procedures of the Agency, and in that order, approved by the Administrator, the Agency Patents Board was established. After the establishment of the Department of HEW, this Board was converted into the Department Patents Board.

At the outset it may be noted that the bulk of the Department's research activity is in the field of medical research. Additionally, it should be noted that the Department's research activities are carried out cooperatively with public and nonprofit agencies and with individual members of the scientific community. This activity is largely accomplished through the administration of a substantial number of grant programs.

The policy of the Department of Health, Education, and Welfare with respect to inventions arising from research conducted with the aid of grants or in the performance of contracts for research is set forth in regulations of the Department (45 CFR, pts. 6–8). These were recently amended to provide more explicitly for contract research and to authorize special alternatives for industrial contracts for the cancer chemotherapy research program. Specific authority to contract for research is comparatively new for this Department, and applies to relatively few programs. Research grant authority is of long standing, and applies to a greater number of programs, including most of those in which there is now authority to contract for research.

The distinction between contracts and grants for research is, roughly speaking, a distinction between a procurement or purchase and assistance or support. Under the research contract authority research for which the Government is to pay is undertaken by an institution pursuant to contractual obligations and in accordance with specifications imposed by the Government. A research grant, on the other hand, is made in support of research activities or projects proposed by an applicant institution. The patent policy has been framed in the light of these distinctions as well as with regard to the basic policy objectives of all research programs of the Department.

The regulations of the Department are controlling on the various constituent agencies of the Department (such as the Public Health Service) in the award grants and in the negotiation of contracts and also in determining the disposition to be made of rights in inventions in accordance with the terms of such awards or contracts.

In the formulation of the patent policies a study by a group of Department officials representative of the various operating agencies resulted in the development of several basic theses. In the first place, it was determined, consistent with Executive Order 10096, that inventions made by employees which are directly related to their official functions or to which the Federal Government has made a substantial contribution, should be owned and controlled by the Government for the public benefit. Patenting in the name of the United States would have significance only as a means to assure the availability of the invention to the public health and safety. In the case of grants for research the basic objective is the same: i.e., the development of knowledge and techniques for use as broadly as possible, for the public health and welfare. In this connection, the responsibility for dissemination of information is a specific duty for the achievement of such objective.

To the accomplishment of such objectives the Department has issued three separate regulations. Title 45, Code of Federal Regulations, subtitle A, parts 6, 7, and 8. As was stated in section 6.1 of part 6:

"Inventions developed through the resources and activities of the Department are a potential resource of great value to the public health and welfare. It is the policy of the Department:

"(a) To safeguard the public interest in inventions developed by Department employees, contractors and grantees with the aid of public funds and facilities; * * *."

In order to accomplish and thus safeguard the public interest "it is the general policy of the Department that the results of Department research should be made widely, promptly, and freely available to other research workers and to the public. This availability can generally be adequately provided by the dedication of a Government-owned invention to the public by publication" (sec. 6.2, ibid).

The provisions of part 7 (dealing with disposition of invention rights to employee inventions) and part 8 (dealing with disposition of invention rights resulting from research grants, fellowship awards, and contracts for research) are all designed to meet the basic objective to safeguard the public interest.

For the convenience of the committee we are supplying at this time copies of the three regulations alluded to above.

Section 8.1 of part 8, relating to research grants, provides in the alternative that:

"(*a*) That the ownership and manner of disposition of all rights in and to such invention shall be subject to determination by the head of the constituent unit responsible for the grant, or

"(*b*) That the ownership and disposition of all domestic rights shall be left for determination by the grantee institution in accordance with the grantee's established policies and procedures, with such modifications as may be agreed upon and specified in the grant, provided the head of the constituent unit finds that these are such as to assure that the invention will be made available without unreasonable restrictions or excessive royalties, and provided the Government shall receive a royalty-free license, with a right to issue sublicenses as provided in section 8.3, under any patent applied for or obtained upon the invention."

It will be noted that the alternative of leaving invention rights to a grantee institution is conditioned upon the availability, under such institution's administration, of the invention rights of any invention without unreasonable restriction or excessive royalties. Section 8.2 provides the criteria for the head of the constituent unit responsible for the grant in determining what disposition shall be made of invention rights. Each of the four alternatives provided by this section is calculated to meet the objective of securing the wide availability of the invention. It will be seen that there is thus provided the criteria for disposition of invention rights in the field of employee inventions, research grants, fellowships and research contracts which are designed to enable the Department to fulfill its responsibilities for the dissemination of scientific and technical information and for serving the health, safety, and welfare of all segments of the population.

Section 8.6 provides for similar disposition of invention rights arising out of the performnace of work under research contracts, with an exception about which more will be said later. The same alternative provided to nonprofit grantee institutions is carried forward in the contract area by a provision in the regulation (8.6(b)) which provides that contracts for research with nonprofit institutions may leave the invention rights for disposition by the institution if it is determined that its policies and procedures are acceptable as meeting the requirements applicable in the grant situation (sec. 8.1(b)).

The cancer chemotherapy program of the Public Health Service is an intensified effort, with special appropriations made available under a congressional directive, to explore exhaustively and rapidly the potentialities of chemical compounds in the control of cancer. Because of the peculiar exigencies of this program and in order that the resources of pharmaceutical and chemical firms may be brought to bear with a minimum of delay, certain exceptions to general Department policy are permitted in the negotiation of industrial contracts for this program. Such exception is set forth in a patent policy statement of the Secretary copy of which is also furnished to committee. In essence, such alternative provides that in industrial research contracts in the cancer chemotherapy program, the contractor may accept either the standard patent clause which implements the general policy of the Department reserving the right of disposition of inventions to the Surgeon General, or a standard alternative clause leaving the right to patent inventions with the contractor subject to certain limitations deemed necessary to protect the public's interest in contracted research. The crucial provision of such alternative (Sec. B. 4 of the policy statement) reserves to the Surgeon General the right, subject to specified procedural safe-guards calculated to make the exercise of such right a deliberate rather than precipitous action, to either dedicate the invention to the public or to issue royalty-free nonexclusive licenses notwithstanding and in derogation of any patent which the contractor had theretofore obtained. The exercise of such right is conditioned upon a finding that either the supply of the invention is inadequate to meet the public need, the price is unreasonable or its quality is insufficient. The procedural steps required to be observed prior to the exercise of the rights are specifically spelled out in paragraph B. 4 of the Secretary's statement of policy.

There is thus provided a mechanism by which the public interest in any inventive advance resulting Government-financed research is protected against inadequacy of supply to meet the public need, unreasonable price or inadequacy of quality. At the same time, there is structured into such policy and the contracts under it a reciprocal protection against precipitate governmental action to destroy the contractor's rights.

Whereas a total of 227 research contracts were entered into by the Public Health Service during the fiscal years 1958 and 1959, under the cancer chemotherapy exception less than 15 contracts were executed which left invention rights to the contractors.

It is the conviction of the Department that its policy of making freely and generally available the benefits of research in lieu of giving away patent rights to contractors is not only consistent with the program responsibilities of the Department, but is in the greater public interest. We also firmly believe that such policy provides equal opportunity to small business to participate in the Department's programs.

EXHIBIT NO. XVI

MANUAL—GENERAL ADMINISTRATION

PART 6—PATENTS AND INVENTIONS

CHAPTER 6-10

REGULATIONS AND PROCEDURES

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6-10-10 Regulations (from *Federal Register* of 9/14/55 and 12/4/57)
From Federal Register, title 45, subtitle A
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Sec. 8.0 Policy.
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6-10-00 SCOPE

A. This Chapter contains:

1. Department regulations relating to inventions (a) made by Department employees, or (b) resulting from research grants, fellowship awards, or research contracts under programs administered by the Department; and

2. Department patent policy, approved 7/31/58 by the Secretary, establishing the limitations referred to in section 8.7 of the Department regulations for the negotiation of cancer chemotherapy industrial research contracts.

B. The substance of the Department regulations relating to employee inventions is incorporated in a statement for the general information of supervisiors and employees which was issued 10/19/56 in HEW General Administration Manual Guide No. 1.

6-10-10 REGULATIONS (from Federal Register of 9/14/55 and 12/4/57)

TITLE 45—PUBLIC WELFARE

SUBTITLE A—DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, GENERAL ADMINISTRATION

PART 6—INVENTIONS AND PATENTS (GENERAL)

PART 7—EMPLOYEE INVENTIONS

PART 8—INVENTIONS RESULTING FROM RESEARCH GRANTS, FELLOWSHIP AWARDS, AND CONTRACTS FOR RESEARCH

The following parts are Department rules and policies relating to inventions which are made by Department employees having a relation to their official duties or with some contribution from the Government or which arise from research or related activities assisted by grants or otherwise under programs administered by the Department.

PART 6—INVENTIONS AND PATENTS (GENERAL)

Sec.
6.0 Definitions.
6.1 General policy.
6.2 Publication or patenting of inventions.
6.3 Government-owned patents; licensing; dedication to the public.
6.4 Central records; confidentiality.
6.5 Procedures relating to employee and grantee inventions.
6.6 Issurance of patents on non-fee basis; certification of public interest.

AUTHORITY: §§ 6.0 to 6.6 issued under Reorg. Plan No. 1 of 1953, 18 F.R. 2053; 3 CFR 1953 Supp. E.O. 10096, 15 F.R. 391; 3 CFR, 1950 Supp.

§ 6.0 *Definitions.* As used in Parts 6, 7, and 8 of this subtitle:

(a) "Department" means the Department of Health, Education, and Welfare.

(b) "Secretary" means the Secretary of Health, Education, and Welfare.

(c) "Head of constituent organization" includes the Surgeon General of the Public Health Service, the Commissioner of Education, Commissioner of Social

Security, Commissioner of Food and Drugs, the Director of Vocational Rehabilitation, and the Superintendent of Saint Elizabeths Hospital.

§ 6.1 *General policy.* Inventions developed through the resources and activities of the Department are a potential resource of great value to the public health and welfare. It is the policy of the Department:

(a) To safeguard the public interest in inventions developed by Department employees, contractors and grantees with the aid of public funds and facilities;

(b) To encourage and recognize individual and cooperative achievement in research and investigations; and

(c) To establish a procedure, consistent with pertinent statutes, Executive orders and general Government regulations, for the determination of rights and obligations relating to the patenting of inventions.

§ 6.2 *Publication or patenting of inventions.* It is the general policy of the Department that the results of Department research should be made widely, promptly and freely available to other research workers and to the public. This availability can generally be adequately preserved by the dedication of a Government-owned invention to the public through publication. Determinations to file a domestic patent application on inventions in which the Department has an interest will be made only if the circumstances indicate that this is desirable in the public interest, and if it is practicable to do so. Department determinations not to apply for a domestic patent on employee inventions are subject to review and approval by the Chairman of the Government Patents Board. Except where deemed necessary for protecting the patent claim, the fact that a patent application has been or may be filed will not require any departure from normal policy regarding the dissemination of the results of Department research.

§ 6.3 *Government-owned patents; licensing; dedication to the public.* All licenses under patents and pending patent applications for the administration of which the Department is responsible shall be issued by the Secretary. Licenses will be royalty-free, revocable and nonexclusive. Except in unusual cases when determined upon recommendation of the head of the constituent organization that unconditional licensing would be contrary to the public interest, licenses will be issued to all applicants and will contain no limitations or standards relating to the quality of the products to be manufactured, sold, or distributed thereunder. To reduce the need for individual license applications, patents held for unconditional licensing shall be dedicated to the public as may be feasible.

§ 6.4 *Central records; confidentiality.* Central files and records shall be maintained of all inventions, patents, and licenses in which the Department has an interest, together with a record of all licenses issued by the Department under such patents. Invention reports required from employees or others for the purpose of obtaining determinations of ownership, and documents and information obtained for the purpose of prosecuting patent applications shall be confidential and shall be disclosed only as required for official purposes or with the consent of the inventor.

§ 6.5 *Procedures relating to employee and grantee inventions.* The Department Patents Officer, with the approval of the Department Patents Board, and the heads of constituent organizations within their respective areas of responsibility, are authorized to issue such procedures and bulletins and take such other actions as may be necessary or desirable to supplement the provisions of Parts 7 and 8 of this subtitle.

§ 6.6 *Issuance of patents on non-fee basis; certification of public interest.* For the purpose of an application for a patent to issue under the non-fee provisions of the Patent Code (35 U.S.C. 266), a certification that an invention is used, or is likely to be used, in the public interest may be executed in behalf of the Secretary by the head of the constituent organization having administrative jurisdiction over the inventor.

PART 7—EMPLOYEE INVENTIONS

Sec.

7.0 Who are employees.
7.1 Duty of employee to report inventions.
7.2 Determination as to patentability.
7.3 Determination as to domestic rights.
7.4 Option to acquire foreign rights.
7.5 Determination as to patenting.
7.6 Department review and determination.
7.7 Notice to employee of determination.
7.8 Employee's right of appeal.

AUTHORITY: §§ 7.0 to 7.8 issued under Reorg. Plan No. 1 of 1953, 18 F.R. 2053; 3 CFR, 1953 Supp. E. O. 10096, 15 F. R. 391; 3 CFR, 1950 Supp.

§ 7.0 *Who are employees.* As used in this part, the term "Government employee" means any officer or employee, civilian or military, except such part-time employees or part-time consultants as may be excluded therefrom by a determination made in writing by the head of the employee's office or constituent organization, pursuant to an exemption approved by the Chairman of the Government Patents Board, that to include him or them would be impracticable or inequitable, giving the reasons therefor. A person shall not be considered to be a part-time employee or part-time consultant for this purpose unless the terms of his employment contemplate that he shall work for less than the minimum number of hours per day, or less than a minimum number of days per week, or less than the minimum number of weeks per year, regularly required of full-time employees of his class.

§ 7.1 *Duty of employee to report inventions.* Any Department employee is required to report promptly to the constituent organization in which he is employed any invention made by him (whether or not jointly with others) which bears any relation to his official duties or which was made in whole or in any part during working hours, or with any contribution of Government facilities, equipment, material, funds or information, or of time or services of other Government employees on official duty. Reports of inventions (except for cases as to which it is decided by the appropriate office or constituent organization, with the concurrence of the Department Patents Officer, that it does not appear they are or may be patentable) shall be forwarded through appropriate channels to the head of the office or constituent organization having administrative jurisdiction over the inventor at the time the invention was made. Thereafter they shall be forwarded with the related administrative recommendations and determinations to the Department Patents Officer.

§ 7.2 *Determination as to patentability.* Upon receiving a report of an employee invention, the head of the appropriate office or constituent organization shall make in writing the decision on behalf of the Department as to whether the results of the research, development, or other activity constitute an invention or inventions which may be patentable.

§ 7.3 *Determination as to domestic rights.* The determination of the ownership of the domestic right, title, and interest in and to an invention which is or may be patentable, made by a Government employee while under the administrative jurisdiction of the Department, shall be made in writing by the head of the appropriate office or constituent organization, in accordance with the provisions of Executive Order 10096 and Government-wide regulations issued thereunder by the Chairman of the Government Patents Board, as follows:

(a) The Government as represented by the Secretary shall obtain the entire domestic right, title and interest in and to all inventions made by any Government employee (1) during working hours, or (2) with a contribution by the Government of facilities, equipment, materials, funds, or information, or of time or services of other Government employees on official duty, or (3) which bear a direct relation to or are made in consequence of the official duties of the inventor.

(b) In any case where the contribution of the Government, as measured by any one or more of the criteria set forth in paragraph (a) of this section, to the invention is insufficient equitably to justify a requirement of assignment to the Government of the entire domestic right, title, and interest in and to such invention, or in any case where the Government has insufficient interest in an invention to obtain the entire domestic right, title, and interest therein (although the Government could obtain same under paragraph (a) of this section, the Department, subject to the approval of the Chairman, shall leave title to such invention in the employee, subject, however, to the reservation to the Government of a nonexclusive, irrevocable, royalty-free license in the invention with power to grant licenses for all governmental purposes, such reservation, in the terms thereof, to appear, where practicable, in any patent, domestic or foreign, which may issue on such invention.

(c) In applying the provisions of paragraphs (a) and (b) of this section, to the facts and circumstances relating to the making of any particular invention, it shall be presumed that an invention made by an employee who is employed or assigned (1) to invent or improve or perfect any art, machine, manufacture, or composition of matter, (2) to conduct or perform research, development work, or both, (3) to supervise, direct, coordinate, or review Government financed or conducted research, development work, or both, or (4) to act in a liaison capacity among governmental or nongovernmental agencies or individuals

engaged in such work, falls within the provisions of paragraph (a) of this section, and it shall be presumed that any invention made by any other employee falls within the provisions of paragraph (b) of this section. Either presumption may be rebutted by the facts or circumstances attendant upon the conditions under which any particular invention is made and, notwithstanding the foregoing, shall not preclude a determination that the invention falls within the provisions of paragraph (d) of this section.

(d) In any case wherein the Government neither (1) obtains the entire domestic right, title and interest in and to an invention pursuant to the provisions of paragraph (a) of this section, nor (2) reserves a nonexclusive, irrevocable, royalty-free license in the invention, with power to grant licenses for all governmental purposes, pursuant to the provisions of paragraph (b) of this section, the Government shall leave the entire right, title and interest in and to the invention in the Government employee, subject to law.

§ 7.4 *Option to acquire foreign rights.* In any case where it is determined that all domestic rights should be assigned to the Government, it shall further be determined, pursuant to Executive Order 9865 and Government-wide regulations issued thereunder, that the Government shall reserve an option to require the assignment of such rights in all or in any specified foreign countries. In case where the inventor is not required to assign the patent rights in any foreign country or countries to the Government, or the Government fails to exercise its option within such period of time as may be provided by regulations issued by the Chairman of the Government Patents Board, any application for a patent which may be filed in such country or countries by the inventor or his assignee shall nevertheless be subject to a nonexclusive, irrevocable, royalty-free license to the Government for all governmental purposes, including the power to issue sublicenses for use in behalf of the Government and/or in furtherance of the foreign policies of the Government.

§ 7.5 *Determination as to patenting.* When the head of the appropriate office, or constituent organization determines in accordance with the provisions of §§ 7.3 and 7.4, that the Government has rights in a patentable invention:

(a) He shall also determine whether the Department should seek to obtain a domestic patent thereon, or whether it shall be published or other action taken in the public interest, giving his reasons therefor; and

(b) He shall further recommend in writing whether the invention should receive foreign patent protection or be published abroad and, if affirmative, should specify the foreign jurisdictions in which action is recommended, giving reasons therefor, and should indicate, if possible, its immediate or future industrial, commercial, or other value, including particularly its value to public health.

§ 7.6 *Department review and determination.* The determination by the head of an office or constituent organization of the ownership of domestic or foreign rights in an invention by a Department employee shall constitute the decision of the Department unless, upon review, the Department Patents Officer questions the consistency of the determination with applicable law or regulations or with Department policy. Any question, unresolved after consultation with the originating unit, will be submitted by the Department Patents Officer to the Department Patent Board which shall either affirm or reverse the determination or return the same to the head of the constituent organization or office for further action. If the Board proposes to determine, or to approve a determination, that the invention shall be required to be assigned to the Government, it may in its discretion afford the employee an opportunity of a hearing.

§ 7.7 *Notice to employee of determination.* The appropriate office or constituent organization shall notify each employee-inventor in writing, of the Department's determination and of his right of appeal, if any. In the case of determinations made by the Department Patents Board, the notification shall be made by the Department Patents Officer. Notice need not be given if the employee stated in writing that he would agree to the determination of ownership which was in fact made.

§ 7.8 *Employee's right of appeal.* An employee who is aggrieved by a determination of the Department may appeal to the Chairman of the Government Patents Board, pursuant to section 4(d) of Executive Order 10096 and regulations issued thereunder, by filing a written appeal with the Chairman, in quadruplicate, and a copy of the appeal with the Department Patents Officer, within 30 days (or such longer period as the Chairman may, for good cause, fix in any case) after receiving written notice of such determination.

PART 8—INVENTIONS RESULTING FROM RESEARCH GRANTS, FELLOWSHIP AWARDS, AND CONTRACTS FOR RESEARCH

Sec.
8.0 Policy.
8.1 Conditions to be included in research grants.
8.2 Determination of domestic rights.
8.3 Licenses to the Government.
8.4 Option to acquire foreign rights.
8.5 Fellowships.
8.6 Contracts for research.
8.7 Cancer chemotherapy industrial research contracts.

AUTHORITY: §§ 8.0 to 8.7 issued under Reorg. Plan No. 1 of 1953 (18 F. R. 2053; 3 CFR, 1953 Supp., E. O. 9865; 12 F. R. 3907; 3 CFR, 1947 Supp., E. O. 10096, 15 F. R. 391; 3 CFR, 1950 Supp.

§ 8.0 *Policy.* (a) The Department of Health, Education, and Welfare each year is expending large sums in the form of grants for research. These grants are made primarily by the Public Health Service in carrying out its broad responsibility under the Public Health Service Act to promote and coordinate research in the field of health and to make available information concerning such research and its practical application. The scientific and technological advances attributable, in varying degrees to this expenditure of public funds frequently include patentable inventions.

(b) The Department, as a matter of policy, takes the position that the results of research supported by grants of public moneys should be utilized in the manner which would best serve the public interest. It is believed that the public interest will in general be best served if inventive advances resulting therefrom are made freely available to the Government, to science, to industry, and to the general public.

(c) On the other hand, in some cases it may be advisable to permit a utilization of the patent process in order to foster an adequate commercial development to make a new invention widely available. Moreover, it is recognized that inventions frequently arise in the course of research activities which also receive substantial support from other sources, as well as from the Federal grant. It would not be consistent with the cooperative nature of such activities to attribute a particular invention primarily to support received from any one source. In all these cases the Department has a responsibility to see that the public use of the fruits of the research will not be unduly restricted or denied.

(d) The following conditions have been adopted to govern the treatment of inventions made in these various types of situations. They are designed to afford suitable protection to the public interest while giving appropriate recognition to the legitimate interests of others who have contributed to the invention.

§ 8.1 *Conditions to be included in research grants.* Subject to legislative directives or Executive orders providing otherwise, all grants in aid of research shall provide as a condition that any invention arising out of the activities assisted by the grant shall be promptly and fully reported, and shall provide, as the head of the constituent unit may determine, either.

(a) That the ownership and manner of disposition of all rights in and to such invention shall be subject to determination by the head of the constituent unit responsible for the grant, or

(b) That the ownership and disposition of all domestic rights shall be left for determination by the grantee institution in accordance with the grantee's established policies and procedures, with such modifications as may be agreed upon and specified in the grant, provided the head of the constituent unit finds that these are such as to assure that the invention will be made available without unreasonable restrictions or excessive royalties, and provided the Government shall receive a royalty-free license, with a right to issue sublicenses as provided in § 8.3, under any patent applied for or obtained upon the invention.

(c) Wherever practicable, any arrangement with the grantee pursuant to paragraph (b) of this section shall provide in accordance with Executive Order 9865 that there be reserved to the Government an option, for a period to be prescribed, to file foreign patent applications upon the invention.

§ 8.2 *Determination as to domestic rights.* Rights in any invention not subject to disposition by the grantee pursuant to paragraph (b) of § 8.1 are for determination by the head of the constituent organization as follows:

(a) If he finds that there is adequate assurance that the invention will either be effectively dedicated to the public, or that any patent which may be ob-

tained thereunder will ge generally available for royalty-free and nonexclusive licensing, the effectuation of these results may be left to the grantee.

(b) If he finds that the invention will thereby be more adequately and quickly developed for widest use and that there are satisfactory safeguards against unreasonable royalties and repressive practices, the invention may be assigned to a competent organization for development and administration for the term of the patent or such lesser period as may be deemed necessary.

(c) If he finds that the interest of another contributing Government agency is paramount to the interest of the Department of Health, Education, and Welfare, or when otherwise legally required or in the public interest, the invention may be left for disposition by that agency in accordance with its own policy.

(d) In all other cases, he shall require that all domestic rights in the invention shall be assigned to the United States unless he determines that the invention is of such doubtful importance or the Government's equity in the invention is so minor that protective measures, except as provided in § 8.3, are not necessary in the public interest.

§ 8.3 *Licenses to the Government.* Any arrangement or determination as to the disposition of rights in inventions pursuant to § 8.1, § 8.2, § 8.5 or § 8.6 shall require that there be reserved under any patent application or patent thereon, domestic or foreign, a nonexclusive, irrevocable, royalty-free license to the Government with power to sublicense for all governmental purposes.

§ 8.4 *Option to acquire foreign rights.* In any case where it is determined that all domestic rights should be assigned to the Government, there shall be reserved to the Government, pursuant to Executive Order 9865 and Government-wide regulations issued thereunder, an option to require the assignment of all rights in the invention in all or in any specified foreign countries. In any case where the inventor is not required to assign the patent rights in any foreign country or countries to the Government, or the Government fails to exercise its option within such period of time as may be provided by regulations issued by the Chairman of the Government Patents Board, any application for a patent which may be filed in such country or countries by the inventor or his assignee shall nevertheless be subject to a nonexclusive, irrevocable, royalty-free license to the Government for all governmental purposes, including the power to sublicense for all governmental purposes.

§ 8.5 *Fellowships.* In the discretion of the head of the responsible constituent organization, the award of a fellowship to a person not a Government employee may provide for the reporting of any invention made during the term thereof, and for its disposition in accordance with the provisions of paragraph (a) of § 8.1, or for its disposition by the institution at which the research was performed in accordance with its established policies, if applicable to such an invention, which meet the requirements of paragraph (b) of such section.

§ 8.6 *Contracts for research.* (a) Contracts for research, with other than nonprofit institution, shall provide that any invention first conceived or actually reduced to practice in the course of the performance of the contract shall be promptly and fully reported to the head of the constitutent organization responsible for the contract, for determination by him as to the manner of disposition of all rights in and to such invention, including the right to require assignment of all rights to the United States or dedication to the public. In the exercise of this power the organization head will be guided by the policy specified in § 8.2 with respect to grants.

(b) Contracts for research with nonprofit institutions shall contain provisions as in paragraph (a) of this section except that, if it is determined that the institution's policies and procedures are acceptable as meeting the requirements of § 8.1(b) with respect to grants, the contract may provide, with such special stipulations in the contract as may be deemed necessary in the public interest, for leaving the ownership and disposition of all domestic rights for determination by the contracting institution in accordance with such policies and procedures.

§ 8.7 (*Cancer chemotherapy industrial research contracts.* Notwithstanding the provisions of § 8.6, the Surgeon General in the negotiation of contracts with other than nonprofit organizations for the cancer chemotherapy research program shall be subject only to such limitations and alternatives as the Secretary may approve for such program.

6-10-20 PATENT POLICY APPLICABLE TO CANCER CHEMOTHERAPY INDUSTRIAL RESEARCH CONTRACTS

A. General

1. The cancer chemotherapy program of the Public Health Service is an intensified effort, with special appropriations made available under a Congressional directive, to explore exhaustively and rapidly the potentialities of chemical compounds in the control of cancer. Because of the peculiar exigencies of this program and in order that the resources of pharmaceutical and chemical firms may be brought to bear with a minimum of delay, certain exceptions to general Department policy will be permitted in the negotiation of industrial contracts for this program.

2. Industrial research contracts for this program may contain either:

a. the standard patent clauses, reserving to the Surgeon General the right to determine the disposition of inventions arising from the performance of the contract or, in lieu of such right,

b. standard alternative clauses leaving the right to patent and exploit such inventions with the contractor, subject to certain limitations deemed necessary to protect the public's interest in the results of the contracted research.

3. Department policy concerning the negotiation and operation of the alternative clauses:

a. *Contract negotiations:* The alternatives indicated will be made available in the negotiations with all contracting companies without discrimination.

b. *Public interest:* The operation of these alternative clauses will be closely reviewed to assure that the following basic objectives are maintained in the public interest:

(1) The availability of information concerning the results of research and the right, without undue delay, to make disclosures to the extent essential to serve the research need;

(2) The availability for development and use of health purposes, on reasonable terms, of inventions arising from the research contract, whether actual development and production is to be made by the contractor himself or by others; and

(3) Sustained concentration on the anti-cancer objective of all resources mobilized for the purposes of the contract.

c. *Contractor's interests:* The Surgeon General or his representatives shall maintain close consultations with the contractor concerning questions affecting the public need for the products of inventions which are subject to the limitations prescribed in the alternative clauses for the protection of the public interest with respect to their supply, price, and quality. The objective of these consultations shall be to promote a mutual awareness of such matters in order to assure to the contractor (under his right to exploit the invention) an opportunity on his own initiative to take such actions regarding them as he believes would be in his and in the public interest.

B. *Contracts for research—Rights left to contractor.* When the contract is for research (including contracts for product development necessary for purposes of research) to be performed by the company (with or without provision for subcontracting), the contract, as an alternative to the standard patent clauses, may provide for leaving to the contractor the right to patent and exploit any invention conceived or first actually reduced to practice in the course of the performance of the contract subject, however, to the following limitations which are deemed necessary to protect the public interest:

1. *Reporting.* Agreement that the contractor will report promptly to the Surgeon General any such invention and will also report promptly the filing of any domestic or foreign patent application thereon or his election not to file such application. Invention Report shall be required after the conception or first actual reduction to practice of each invention that reasonably appears to be patentable and, in any event, as soon as any evidence of utility has been developed (whether in a health or other field of use).

2. *Disclosure.* Reservation to the Surgeon General of the right to make disclosure of the invention, whenever he deems it in the public interest, after taking into consideration a reasonable opportunity to the contractor to protect such rights as he may have in the invention. The contract may specify that such disclosure shall not in any case, without the consent of the contractor, be made

in less than six months from the time the Surgeon General determines the invention was or should have been reported.

3. *License to the Government.* Reservation to the Government of an irrevocable, nonexclusive, royalty-free license to practice or cause to be practiced, by or for the Government throughout the world, each subject invention (whether patented or unpatented) in the manufacture, use or disposition according to law of any article or material or in the use of any method or process.

4. *Failure to meet health needs.*

a. In recognition of the Government's investment and the public interest in the results of contracted research, agreement that whenever, subsequent to the contractor's filing of a patent application for any invention conceived or first actually reduced to practice in the course of the performance of a contract, the Surgeon General, after obtaining and considering the advice of such advisory bodies or consultants as he deems appropriate and competent, has ground to believe that such invention, whether related to a product, process, or otherwise, is at such stage of development that if it were more generally available it would meet a health need and that the public interest [1] requires the invention to be available for health purposes to others than the contractor and his licensees, he shall so notify the contractor, giving reasons therefor, and request him, within a time specified, to take appropriate steps to meet the public need, which may include the issuance of licenses to additional manufacturers of the contractor's own selection. (Such requests shall be supplementary to such informal consultations between the Surgeon General or his representative and the contractor as have taken place in accordance with the provisions of section A.3c above.)

b. If, upon expiration of the time specified, or such extension thereof as approved by the Surgeon General, the Surgeon General finds that the contractor has failed to take appropriate steps adequate to meet the public need, he shall notify the contractor, with reasons therefor, that at the end of 90 days from such notice he will exercise the rights specified below. If within 20 days of receipt of such notice the contractor fails to file a written request for a hearing as provided below, the Surgeon General shall upon expiration of the above 90-day period have the right:

(1) to dedicate to the public all rights in the invention [2] or;

(2) to issue (under or in anticipation of the issuance of any such patent) nonexclusive, royalty-free licenses (for practice of the invention for any health purpose) on a nondiscriminatory basis to all qualified applicants to use, manufacture and sell embodiments of the invention for any health purpose.[3]

c. If, within 20 days of receipt of notice, the contractor files such request for a hearing, the Surgeon General, or a representative or representatives designated by him for this purpose, shall afford the contractor a reasonable opportunity to be heard, to be represented by counsel, to present any pertinent information and argument, and to rebut any other information to be considered in reaching a decision. The findings by the Surgeon General or such representative(s) shall be in writing, shall be based solely on the material presented at the hearing, and shall be final and binding on the contractor. If the Surgeon General's decision based on these findings be that the contractor has not met the public need and that public dedication or additional licensing by the Surgeon General is necessary in the public interest, he may so dedicate or license, effective at the end of the above-provided 90-day period or at the conclusion of the hearing, whichever is later.

5. *Contractor's determination not to patent—Failure to pursue application.* Agreement that in the event the contractor elects, within a period (not to exceed six months after the invention was or should have been reported) specified in the contract, not to file a patent application on the invention, or, having elected to file thereafter fails to file and diligently prosecute a patent application, the Surgeon General, when he deems it necessary in order to protect the availability of the invention for health purposes, shall have the right to require the assignment to the Government of all domestic rights therein except for the reservation of a nonexclusive royalty-free license to the contractor.

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[1] With respect to supply, quality, or price.

[2] Such dedication to be effective against the contractor and any persons claiming from him upon filing by the Surgeon General with the Commissioner of Patents of notice of same.

[3] Either one or both of these alternatives shall be specified in the contract.

6. *Foreign rights.* Similarly, agreement that if the contractor fails to file, or elects not to file, foreign patent applications which the Surgeon General determines are necessary to protect the availability of the invention for health purposes in other countries, the Surgeon General may require the assignment of the foreign rights.

7. *Renegotiation on new leads.* (Such a provision not mandatory). The contract may provide that if, in the course of the performance of the contract, the contractor identifies any new lead which it wishes to develop at its own expense, without utilization of facilities financed by the Government, the Surgeon General may, when he deems it consistent with advancement of the research purposes of the Government, renegotiate the application of the patent provisions of the contract to such new lead. Any modification of the terms of the contract shall be upon such consideration (which may be used to reduce the obligation of the Government under the contract) as the Surgeon General may deem equitable under the circumstances, after taking into consideration the extent of the investment of the Government in relation to the probable cost of further development.

C. *Contracting with suppliers for screening and testing only.*

1. When a company furnishes, for controlled screening and testing only, compounds or products not otherwise available to the Service and in which the company has a proprietary interest, the contract may provide that all rights in the compound or product shall remain in the company. It may additionally provide for confidentiality of the results for a limited period after the completion of the screening process and the report of the results by the Service to the supplier. Such period, as to results deemed significant for the research purpose, shall not exceed 12 months.

2. When the screening and testing of compounds obtained from the supplier under such a contract is carried out by an outside laboratory, the contract of the Service with the laboratory wil contain provisions to safeguard the rights of the supplier under its contract with the Service.

D. *Inventions by Federal employees.* Inventions made by Federal employees, or by Federal employees jointly with others, are subject to determination under applicable Executive Orders and Department regulations. Appropriate reference to this requirement will be made in connection with contracts with suppliers of chemical compounds for use in research to be conducted by the Service, and contracts for research and development in which Federal employees may in any way participate.

E. *Background patents or rights.* Nothing in this policy statement shall be deemed to limit the authority of the Surgeon General to negotiate for a license or other rights under existing patents or involving the use of patented or unpatented compounds or processes, as he may deem necessary for the effective prosecution of the cancer chemotherapy program.

Senator LONG. We will insert in the record at this point a statement by Representative McDowell, of Delaware, with accompanying exhibits; and also a letter dated December 7, 1959, from the Department of Justice.

(The documents referred to follow:)

PREPARED STATEMENT OF HON. HARRIS B. MCDOWELL, JR., MEMBER OF U.S. HOUSE OF REPRESENTATIVES OF DELAWARE, WITH ACCOMPANYING EXHIBITS

Mr. MCDOWELL. Mr. Chairman, an article by Ronald J. Ostrow in the Wall Street Journal of June 10, 1959, proves the need for a complete overhaul of the patent policies of the U.S. Government.

U.S. Government patent policies, in the words of one high-ranking patent official, are "a mess," and with the Federal Government now footing the cost of more than half the research in this country, agitation for a general overhaul of the system is increasing both in the Congress and elsewhere.

Two points are at issue: First, whether present patent policies are fostering or hindering development of inventions, improvements, and discoveries; and, second, whether the Federal Government itself is hastening the death of small business by encouraging big business dominance and monoply of research.

Within the past 10 years Federal expenditures on research have jumped from about $1 billion annually to more than $5 billion—with $3.5 billion for the

Department of Defense alone in the 1960 budget. Private industry altogether spends only $4 billion on its own research.

The Defense Department allows a company to keep any patents it develops, except for free use by the Government.

Many people have asked with good reason why the United States does not at least recoup its research costs by taking a cut of the commercial royalties. The British Government has been doing this for over 50 years and no one of repute has seriously contended that it hindered research there. The Vickers Viscount, developed under Government contract, has returned enough to the British treasury to pay off the original research cost and yield a profit. Jet engines have clearly been a profitable venture for the British Government. Clearly, too, British research and development is among the finest in the world.

There is no overall Federal Government policy on patents in Washington, as was pointed out in a fine article in the trade magazine, Product Engineering, published by McGraw-Hill, May 4, 1959, written by David Secrest.

The Defense Department, the National Aeronautics and Space Administration, and the Atomic Energy Commission reflect three widely differing patent policies. Since many contracts cut across several Federal departments and agencies, the contractor may be dealing with half-a-dozen different patent attitudes on the same project. Certainly nothing could be more confusing, or more deleterious to the defense effort for that matter, than the lack of a sound, sane governmentwide patent policy.

I have joined with the gentleman from New Jersey, Representative Frank Thompson, Jr., and the gentleman from Utah, Representative David S. King, in offering legislation which would establish an overall U.S. patent policy and end the present confusion and "mess."

My bill, H.R. 7705, is directed primarily at the patent policy of the armed services, and preserves the present patent policies of the Tennessee Valley Authority, the Atomic Energy Commission, the National Aeronautics and Space Administration, and the Departments of Agriculture, and Health, Education, and Welfare.

Under my bill the Federal Government would share in patent royalties just as the British Government does on inventions resulting from research contracts of the National Government, and small business would be helped. The present strong monopolistic trend which dominates the Federal research and development program would be halted. The record shows that 5 percent of the larger industries and research organizations in this country are now gobbling up much of the research and development talent, the brains, and the know-how as well as 95 percent of the research contracts and doing this with Federal funds. In fact, the small business taxpayer is helping to pay for his own demise under the present patent policy.

The magazine, Product Engineering, to which I have referred, declares that:

EXHIBIT No. XVII(A)

[Excerpt from magazine, Product Engineering]

"Excessive channeling of research contracts into big business is causing considerable worry. Big business (over 500 employees) gets at least 95 percent of the Government research, and 100 firms get 85 percent among them. The top 14 companies getting contracts between 1954 and 1956 were all big electric and aircraft companies. The Attorney General has warned that channeling all this patent potential into big business is just building up the monopoly trend.

"The House Small Business Committee recently spoke of the 'ominous shadow cast on the future with the monopoly of technology by big business.' Small business helps foot the Government research bill and should at least have access to patents developed at the taxpayers' expense. The big contractors reply that it is their reservoir of knowledge that makes research successful."

Miss Sylvia Porter made some of the same points in an article she wrote about the final report made by the House Small Business Committee on its investigations in 1955 and 1956. I include her short article at this point in my remarks.

(The article referred to follows:)

EXHIBIT NO. XVII(B)

PLIGHT OF SMALL BUSINESS: GOVERNMENT FRETS, BUT ACTS CONTRARIWISE

(By Sylvia Porter)

The Government itself well may be giving the kiss of death to independent small business in our land—through the Defense Department's program of channeling huge amounts of funds for research and development year after year almost exclusively to big business.

The importance of this cannot be overestimated.

In our age of technological revolution, research has become crucial. In more and more industries, what a corporation gets out of research decides whether it thrives or dies.

Yet, despite the Government's oft-repeated concern about the trend toward concentration of industrial power, its own policies are contributing to this trend. And no one who has the facts can deny it.

The House Small Business Committee of the 84th Congress has just released its final report on its investigations in 1955 and 1956. I have studied every page of the chilling 191-page document which leads its chairman, Wright Patman, Democrat, Texas, to predict that if the trends of the past 5 years continue, "within 18 years all manufacturing business and most of the distribution and service business of the Nation will be controlled by corporations having more than $100 million of assets."

But this colorful comment of the controversial Patman is not what impressed me. Rather what hit me was a chapter tucked far back in the report entitled "Government Subsidies for Research and Industrial Advancement," for it tells the following tale:

The Government currently pays for almost two-thirds of all research and development in our country.

The Defense Department is by far the biggest spender of the funds, and it alone passes out about $1.5 billion of research money annually to private companies, "100,000 times as great as the Small Business Administration's whole lending program, designed to assist small-business expansion."

Now where does the money go?

A full 95 percent of it goes to companies employing more than 500 workers. This certainly fits the definition of big business firms.

In the past 3 years, research contracts totaling $4.7 billion have been awarded. Of this $4.6 billion, or 98.1 percent, has gone to the 500 largest contractors.

What are some of the implications of this?

The companies doing the research turn up not only inventions for defense but also products for civilian uses.

To quote the Attorney General himself: "Processed foods, electronic devices, and penicillin, to list only a few present-day commercial products, were all originally developed under research and development programs for defense purposes."

The companies have the privilege, under our national patent policy, to patent and control an invention if they want to. In the past 5 years alone, the companies have claimed rights to at least 6,788 inventions.

Again, this leads the Attorney General to make the extraordinary admission: "What indications are available warn that the Government expenditures may not run counter to the industry trend toward concentration but in some degree may even enforce it?"

So what, then, should be done? At a minimum, the report suggests:

The administration should eliminate the "statistical vacuum" that exists on who's getting what for research so a sound program can be worked out that will better protect our competitive system.

It certainly should greatly simplify the contract bidding process so smaller companies won't be under so brutal a disadvantage.

It should make sure that the officers in charge of awarding contracts don't discriminate against small business because of their cautious tendency to deal only with firms which have an established reputation.

It surely should begin at once a reexamination of our whole patent policy to see what amendments are in order.

In 1943, President Roosevelt asked the Attorney General to investigate Government patent practices and policies and to report to him with recommendations respecting the relationships of contractors and of Government employees to the Government with respect to their respective inventions. On the subject of inventions made by Government contractors, the Attorney General made the following findings and conclusions in his "Report of the Attorney General, Investigation of Government Patent Practices and Policies, 1947":

EXHIBIT NO XVII(C)

Excerpts from report of the Attorney General

1. Where patentable inventions are made in the course of performing a Government-financed contract for research and development, the public interest requires that all rights to such inventions be assigned to the Government and not left to the private ownership of the contractor. Public control will assure free and equal availability of the inventions to American industry and science; will eliminate any competitive advantage to the contractor chosen to perform the research work; will avoid undue concentration of economic power in the hands of a few large corporations; will tend to increase and diversify available research facilities within the United States to the Advantage of the Government and of the national economy; and will thus strengthen our American system of free, competitive enterprise.

2. To leave patent rights to the contractor may permit the suppression of an invention paid for by the public, or the imposition of an assessment for its use by the public to serve private advantage. It would constitute an unequal form of reward for comparable performance, and would tend to unbalance Federal research by making more desirable those aspects likely to lead to commercially valuable patent rights.

3. Expert opinion and experience within and without the Government support the conclusion that a policy of public ownership of inventions made under Government contract would be acceptable to a sufficient number of competent private and institutional laboratories to make it workable. However, exceptions to the basic policy should be allowed where necessary in emergency situations, to permit the contractor to retain the patent rights to inventions to which he has already made a substantial independent contribution; but in all such cases the Government should obtain at least a free license under the resulting inventions and should prohibit their suppression or the assessment of unreasonable charges for their use by others.

4. The weight of evidence is that the policy recommended herein will not substantially increase the cost of Government research contracts, or diminish the efforts of the contractor's organization to perform the work competently. To the extent that extra costs may result from the recommended policy, they would be fully justified by the advantages of making publicly financed technology broadly and freely available.

The report included recommendations consistent with these findings, and I think this committee could very well consider the feasibility of developing legislation to implement these recommendations of the Attorney General, and helping to get it enacted into law.

With your permission I would like to include here as part of my remarks the text of my H.R. 7705; the article by Ronald J. Ostrow in the Wall Street Journal of June 10, 1959, to which I have referred; and the text of chapter VI, of the final report of the Select Committee on Small Business, 84th Congress, 2d session, entitled "Government Subsidies for Research and Industrial Development."

(The documents referred to follow:)

EXHIBIT No. XVII(D)

[H.R. 7705, 86th Cong., 1st sess.]

A BILL To amend chapter 27 of title 35 of the United States Code with respect to the rights of the United States in certain patents arising out of research and development contracts with the United States

Be is enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That chapter 27 of title 35 of the United States Code is amended by adding at the end thereof the following: "§ 268. Rights of United States in certain patents

"(a) In the case of any patent hereafter granted which is based upon an invention, improvement, or discovery conceived or first actually reduced to practice in the course of performance of any research or development contract with a procurement agency, or of any subcontract of such a contract, or in the course of the performance of any prior experimental, developmental, or research work done upon the understanding that a contract (whether or not a research or development contract) with a procurement agency would be awarded, the United States shall have royalty-free, nonexclusive license to practice or have practiced such invention, improvement, or discovery. Each research or development contract hereafter awarded by a procurement agency shall provide that in the case of any patent covered by the preceding sentence, the United States shall receive a percentage, determined by negotiation as provided in the contract, of the income from the commercial utilization of the invention, improvement, or discovery patented.

"(b) As used in this section (1) the term 'research or development contract' means a contract entered into by a procurement agency under which payment is to be made for experimental, developmental, or research work; and (2) the term 'procurement agency' means the General Services Administration, the Post Office Department, the Department of the Army, the Department of the Navy, the Department of the Air Force, and the Department of Defense."

SEC. 2. The analysis of such chapter 27 is amended by inserting immediately below

"267. Time for taking action in Government applications."

the following:

"268. Rights of United States in certain patents."

EXHIBIT No. XVII(E)

[From the Wall Street Journal, June 10, 1959]

SWORD TO PLOWSHARE: MILITARY RESEARCH BRINGS GROWING FLOOD OF CIVILIAN PRODUCTS—ARMY HUT TURNS INTO BEACH HOUSE—NAVY GENERATOR GOES TO WORK ON PIPELINE—BUT SOME SECRETS SLIP AWAY

(By Ronald J. Ostrow)

Corporate Research, Inc., a year-old Ann Arbor, Mich., concern, plans to introduce this summer a round 230-square-foot house made of a plastic foam material lined with kraft paper. The company, aiming for the beach house and playhouse markets, will sell the house for about $249.

New York Savings Bank just installed a high-speed facsimile communications system linking its main office on Manhattan's 14th Street with a branch office at 46th Street and Lexington Avenue. The particular type of facsimile system was developed and is being produced by Alden Electronics & Impulse Recording Co., an affiliate of Alden Products Co., of Brockton, Mass.

These newly developed products have something in common: They were developed primarily with Government funds and made their debuts in the military market. The house grew out of an Army research contract aimed at finding

light, portable huts to house troops; the facsimile system resulted from a Navy contract.

AN INCREASING IMPACT

The mushrooming expenditures by the Government for what is familiarly known in industry as R. & D., is having an increasing impact on private industry, and ultimately on consumers. In the current fiscal year the Pentagon is spending about 90 percent of its $3 billion research, development, and evaluation outlay among more than 1,700 private U.S. concerns. A year ago the Pentagon distributed a smaller amount among about 1,600 companies.

Look at some other cases where Government-sponsored R. & D. contracts led to products that found their way into civilian markets, and you get an idea of the diversity of the civilian goods that emerge by this route.

American Optical Co., of Southbridge, Mass., recently began selling a new type of lightweight sunglasses with straight side-pieces, designed to slip on and off easily, but to remain firmly in place when worn. A $367,000 Air Force R. & D. contract financed development of the glasses, originally made to be used by flyers while wearing radio headphones. "The reception (by the civilian market) has been very good already, and we expect very good sales," says an American Optical official.

GENERATORS AND POWERPLANTS

Texas Eastern Gas Transmission Corp. plans shortly to install a 300-kilowatt generator on its natural gas pipeline in Louisiana. The generator, a newly developed product of Solar Aircraft Co., of San Diego, is powered by a 500-horsepower Jupiter gas turbine engine that has been converted to run on natural gas. Solar began to develop the engine in 1947 under a Navy Bureau of Ships contract when the Navy was seeking a shipboard emergency generator. Other models of the Jupiter are on consignment to two boat builders who are experimenting with them as powerplants to run personnel craft for offshore petroleum operations.

Coleman Engineering Co., Inc., of Torrance, Calif., has sold 600 of its Digitizer devices, 70 percent of these to commercial markets, since it developed the machine while working on a $50,000 Navy contract in 1952 to develop a specialized automatic data handling machine. The Digitizer converts the movements of gages and other motion into numbers, then transmits this data to a computer; commercial applications include automatically recording temperatures and pressures in oil refineries and recording and transmitting weather data from remote observation stations, eliminating the need for such stations to be manned.

A company developing a device under a Government contract usually retains commercial patent rights, but yields to Uncle Sam a royalty-free license to have the item manufactured for military use.

Companies aren't always able to take a product developed for the military and convert it directly into an item for the civilian market, of course. "Commercial benefits from Government R. & D. are usually indirect," says Dr. James E. Lipp, director of development planning for Lockheed Aircraft Corp., of Burbank, Calif. "Technical advances made under Government sponsorship are usually applied in altered form and at a later time in our commercial products," he adds.

A MAJOR EXAMPLE

A neighboring competitor of Lockheed, Douglas Aircraft Co., Inc., provides a major example of these indirect benefits. Says A. E. Raymond, senior vice president-engineering: "The DC–8 jet airliner we're getting into service now follows the pattern of sweptback-wing planes we developed for the military."

A Douglas official explains that sweptwing aircraft, which have greater speed potential, have different flight characteristics than the conventional straight-wing planes. For one thing, the center of gravity in a sweptwing craft is farther to the rear, and the plane has a tendency to be less stable at low speeds.

To work out this and other problems, Douglas, under a Navy R. & D. contract, built the experimental sweptwing, needle-nose D–558–2 Skyrocket, a rocket-powered plane that first flew in February 1948. Later, with Navy contracts, Douglas turned out the sweptwing A3D, which first flew nearly 6 years ago but still is being produced and used as a bomber by the fleet.

"Military experience in operation and design is very useful commercially," says Mr. Raymond, "because the military is pushing for performance primarily,

rather than safety. They try out new developments first, so commercial planes always derive some benefit from military designs."

Mr. Raymond is unable to estimate the amount his company saved through military-sponsored research in developing the DC–8, but notes: "If we hadn't had the military experience, we couldn't have built it at all."

Besides reaping both direct and indirect benefits from Government R. & D. projects, companies involved in these projects say the work allows them to maintain larger scientific and engineering staffs than they otherwise would be able to afford. They also find that working for Uncle Sam gives them access to reports on the progress of others in their industry; these reports yield vital technical information.

Observing that "civilian fallout from military R. & D. work is a hard thing to measure," a Raytheon Manufacturing Co. official declares: "We always benefit from military R. & D. inasmuch as it permits us to maintain a large and well-rounded scientific and engineering staff. From their research efforts, we derive a breadth and depth of technical knowledge that we would not be able to achieve solely from commercial R. & D."

Raytheon's development of radar for the Navy during World War II, with the resulting growth of a staff skilled in radar principles, is probably a classic example of Government-sponsored R. & D. enhancing a company's profit capabilities. "Today, we're a leading producer of commercial ship radar, the basic know-how for which we gained from the Navy work," an official of the Waltham, Mass., concern says. The commercial work is in addition to the radar Raytheon turns out for the military, he adds.

A MIXED BLESSING

Companies at work on Government R. & D. programs and sharing technical information with other concerns engaged in like tasks say this exchange proves a mixed blessing.

"These reports enable us to save a great deal of money and effort by not duplicating something another company has done already," says the president of a company which develops and manufactures semiconductors.

But this executive comments that "technical information sharing is one of the prices a company pays for being engaged in Government R. & D." And he offers an example of how some electronics companies got a boost from the Government research work done by one of their competitors.

Backed by a military contract, a young, small east coast concern "did a whizbang job of developing a silicon power rectifier," a piece of electronic hardware that converts alternating electrical current to direct current. "The minute they were out with this thing, others in the industry who had not been able to develop the rectifier on their own got a copy of the Government report and gleaned vital clues on how to produce the device," he says. The result was that a number of companies had the rectifier on the market at least a year sooner than they would if they had had to develop it entirely on their own.

In this case the company's development was not patentable, and there was nothing to prevent other companies from using the information learned through the Government report in producing their own versions.

A QUICKER EVALUATION

A company doing military-sponsored research often gets an earlier evaluation of how its work is going than it would if the research was aimed only for commercial markets, companies say.

"You get a good, early calibration of where your R. & D. stands in military work, not years later as is often the case in commercial research," contends Roy L. Ash, executive vice president of Litton Industries, Inc., Beverly Hills, Calif., electronics concern, whose military development and production currently accounts for about 45 percent of total volume.

"When competing in the commercial market, you often spend several years in the laboratory conceiving and developing a product, and then you take time to develop a market program and to test it, before you finally get around to putting the decision of your success up to the public," notes Mr. Ash. "But when you're selling to the military, they're interested in technological improvements just over the horizon—the best brainwork to this point. The Government," Mr. Ash adds, "is able to provide an early evaluation of your R. & D. effort."

light, portable huts to house troops; the facsimile system resulted from a Navy contract.

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American Optical Co., of Southbridge, Mass., recently began selling a new type of lightweight sunglasses with straight side-pieces, designed to slip on and off easily, but to remain firmly in place when worn. A $367,000 Air Force R. & D. contract financed development of the glasses, originally made to be used by flyers while wearing radio headphones. "The reception (by the civilian market) has been very good already, and we expect very good sales," says an American Optical official.

GENERATORS AND POWERPLANTS

Texas Eastern Gas Transmission Corp. plans shortly to install a 300-kilowatt generator on its natural gas pipeline in Louisiana. The generator, a newly developed product of Solar Aircraft Co., of San Diego, is powered by a 500-horsepower Jupiter gas turbine engine that has been converted to run on natural gas. Solar began to develop the engine in 1947 under a Navy Bureau of Ships contract when the Navy was seeking a shipboard emergency generator. Other models of the Jupiter are on consignment to two boat builders who are experimenting with them as powerplants to run personnel craft for offshore petroleum operations.

Coleman Engineering Co., Inc., of Torrance, Calif., has sold 600 of its Digitizer devices, 70 percent of these to commercial markets, since it developed the machine while working on a $50,000 Navy contract in 1952 to develop a specialized automatic data handling machine. The Digitizer converts the movements of gages and other motion into numbers, then transmits this data to a computer; commercial applications include automatically recording temperatures and pressures in oil refineries and recording and transmitting weather data from remote observation stations, eliminating the need for such stations to be manned.

A company developing a device under a Government contract usually retains commercial patent rights, but yields to Uncle Sam a royalty-free license to have the item manufactured for military use.

Companies aren't always able to take a product developed for the military and convert it directly into an item for the civilian market, of course. "Commercial benefits from Government R. & D. are usually indirect," says Dr. James E. Lipp, director of development planning for Lockheed Aircraft Corp., of Burbank, Calif. "Technical advances made under Government sponsorship are usually applied in altered form and at a later time in our commercial products," he adds.

A MAJOR EXAMPLE

A neighboring competitor of Lockheed, Douglas Aircraft Co., Inc., provides a major example of these indirect benefits. Says A. E. Raymond, senior vice president-engineering: "The DC–8 jet airliner we're getting into service now follows the pattern of sweptback-wing planes we developed for the military."

A Douglas official explains that sweptwing aircraft, which have greater speed potential, have different flight characteristics than the conventional straight-wing planes. For one thing, the center of gravity in a sweptwing craft is farther to the rear, and the plane has a tendency to be less stable at low speeds.

To work out this and other problems, Douglas, under a Navy R. & D. contract, built the experimental sweptwing, needle-nose D–558–2 Skyrocket, a rocket-powered plane that first flew in February 1948. Later, with Navy contracts, Douglas turned out the sweptwing A3D, which first flew nearly 6 years ago but still is being produced and used as a bomber by the fleet.

"Military experience in operation and design is very useful commercially," says Mr. Raymond, "because the military is pushing for performance primarily,

rather than safety. They try out new developments first, so commercial planes always derive some benefit from military designs."

Mr. Raymond is unable to estimate the amount his company saved through military-sponsored research in developing the DC–8, but notes: "If we hadn't had the military experience, we couldn't have built it at all."

Besides reaping both direct and indirect benefits from Government R. & D. projects, companies involved in these projects say the work allows them to maintain larger scientific and engineering staffs than they otherwise would be able to afford. They also find that working for Uncle Sam gives them access to reports on the progress of others in their industry; these reports yield vital technical information.

Observing that "civilian fallout from military R. & D. work is a hard thing to measure," a Raytheon Manufacturing Co. official declares: "We always benefit from military R. & D. inasmuch as it permits us to maintain a large and well-rounded scientific and engineering staff. From their research efforts, we derive a breadth and depth of technical knowledge that we would not be able to achieve solely from commercial R. & D."

Raytheon's development of radar for the Navy during World War II, with the resulting growth of a staff skilled in radar principles, is probably a classic example of Government-sponsored R. & D. enhancing a company's profit capabilities. "Today, we're a leading producer of commercial ship radar, the basic know-how for which we gained from the Navy work," an official of the Waltham, Mass., concern says. The commercial work is in addition to the radar Raytheon turns out for the military, he adds.

A MIXED BLESSING

Companies at work on Government R. & D. programs and sharing technical information with other concerns engaged in like tasks say this exchange proves a mixed blessing.

"These reports enable us to save a great deal of money and effort by not duplicating something another company has done already," says the president of a company which develops and manufactures semiconductors.

But this executive comments that "technical information sharing is one of the prices a company pays for being engaged in Government R. & D." And he offers an example of how some electronics companies got a boost from the Government research work done by one of their competitors.

Backed by a military contract, a young, small east coast concern "did a whizbang job of developing a silicon power rectifier," a piece of electronic hardware that converts alternating electrical current to direct current. "The minute they were out with this thing, others in the industry who had not been able to develop the rectifier on their own got a copy of the Government report and gleaned vital clues on how to produce the device," he says. The result was that a number of companies had the rectifier on the market at least a year sooner than they would if they had had to develop it entirely on their own.

In this case the company's development was not patentable, and there was nothing to prevent other companies from using the information learned through the Government report in producing their own versions.

A QUICKER EVALUATION

A company doing military-sponsored research often gets an earlier evaluation of how its work is going than it would if the research was aimed only for commercial markets, companies say.

"You get a good, early calibration of where your R. & D. stands in military work, not years later as is often the case in commercial research," contends Roy L. Ash, executive vice president of Litton Industries, Inc., Beverly Hills, Calif., electronics concern, whose military development and production currently accounts for about 45 percent of total volume.

"When competing in the commercial market, you often spend several years in the laboratory conceiving and developing a product, and then you take time to develop a market program and to test it, before you finally get around to putting the decision of your success up to the public," notes Mr. Ash. "But when you're selling to the military, they're interested in technological improvements just over the horizon—the best brainwork to this point. The Government," Mr. Ash adds, "is able to provide an early evaluation of your R. & D. effort."

Small companies often sing the loudest praise of Government R. & D. They say that with the aid of Uncle Sam's research money they're able to investigate fields that would be too expensive for them to look into with just their own resources.

COULDN'T AFFORD THE RESEARCH

"A company our size couldn't afford to be in this basis research if it weren't for Government contracts," says Ralph F. Redemske, vice president of Servomechanisms, Inc., Hawthorne, Calif., developer and producer of electromechanical systems and components whose sales totaled about $17 million last year. Mr. Redemske is speaking specifically of the company's investigation of thermoelectric power—the conversion of heat into electricity—under Navy sponsorship since 1957. The research, being carried on at the company's Santa Barbara, Calif., facility, is now at the rate of $100,000 a year, according to Mr. Redemske.

Government research contractors, both big and small, insist that the direct profits from an R. & D. contract are not what prompt them to vie for the work.

"There's not much profit in Government R. & D. work, especially when you develop just one of something," says an official of Packard-Bell Electronics Corp., Santa Monica, Calif. "But you learn how to make something new, advancing the state of the art, which very often leads to commercial or Government production contracts. Very often the gleam in an eye in your lab is going to produce a hum in your production line—regardless of who finances it."

Litton Industries' Mr. Ash also discounts the profits directly resulting from such work. "Litton isn't in this work to sell its engineering services for a fee," he says. "We look at it from the standpoint that for every dollar of engineering we do, there's $10 or $15 or $20 worth of future product sold."

A SMALLER PROFIT

Mr. Ash says that cost-plus-fixed-fee work, typically associated with military R. & D. yields a pretax profit of 6 or 7 percent of sales, lower than the 10-percent profit he says is generally associated with military fixed-price production contracts.

"The possible profit you can make from an R. & D. contract is so small that going out for that alone is hardly worthwhile," asserts Dr. James Carter, research adviser of Aerojet-General Corp., Azusa, Calif., subsidiary of General Tire & Rubber Co. "Of course, there's always the possibility of the research contract leading to military production or commercial application," he adds.

Although he won't forecast when any of them might reach the market, Aerojet-General has several commercial applications from some of its military research in the works, Dr. Carter says. One project: Adapting nitromethane as a commercial explosive. "Under a Navy contract, some years ago we did a great deal of investigation of nitromethane as a monopropellant—for missiles—one that would be a fuel and an oxidizer at the same time," Dr. Carter recalls. "However, it proved to be either too hazardous as a fuel or to have combustion difficulties."

Aided by its fuel study, Aerojet-General has ironed out some of the problems and now is working with petroleum companies studying the use of nitromethane in seismic oil exploration and also as the agent for underground explosions to step up the yield from low-producing wells. "It's much safer than nitroglycerine," claims Dr. Carter, "and because it's a liquid it's easier to place than solid explosives in a number of applications."

A SUBSTANTIAL PORTION

Although Government R. & D. contracts may offer lower profits than that which companies usually pursue, the dollar amount of the work often is much greater than what they themselves put into research, and accounts for a substantial portion of their total sales volume. For example, Lockheed in 1958 had volume of $962,679,211, which included $323,900,000 of Government research and development contracts. In the same period Lockheed spent $25.2 million on its own research and development program. This year the aircraft and missile maker expects to do $400 million of Government-sponsored R. & D. while digging down in its own pocket for about $12 million.

"In an industry with a rapidly expanding technology like ours," says Lockheed's Dr. Lipp, "a strong R. & D. program is a necessary foundation for virtually all of Lockheed's sales."

Despite the chance of a hefty production contract or profitable commercial application, companies note that Government R. & D. contracts in some cases have some major disadvantages. For one thing, they say a company's patent position is sometimes damaged by work it does under Government contracts. They also say that nonmilitary projects often are delayed by work on military R. & D. jobs, which usually are on a rush basis, and that Government research wants often are too specialized to do a company's commercial market much good.

Another reason is that companies doing big Government R. & D. projects are, of course, at the mercy of the Federal Government; sudden cutbacks as the result of budget problems or other reasons often have a severe impact. A classic example was the cancellation in 1957 of R. & D. work being done by North American Aviation, Inc., on the Navaho missile. The work had started in 1950 and by the time it was canceled some $700 million had been poured into it. North American had to lay off 12,000 people when the project was dropped.

Space age concerns, in particular, are upset these days by the regulations of the youthful National Aeronautics and Space Administration regarding patent rights. Just last month a delegation representing some of these contractors trouped to Washington to urge that the agency revamp its rules.

ALL RIGHTS CLAIMED

Terms of the 1958 law which created NASA to oversee the U.S. space programs seem to give the Federal Government the right to claim all rights—commercial as well as military—to any invention resulting from a NASA contract. Critics of the legislation say this is contrary to the usual practice under Armed Forces procurement provisions, where a company developing a device under a Government contract retains its commercial patent rights.

Contractors complain that besides retaining both commercial and military rights, NASA regulations define a contract so broadly that a subcontractor or supplier to a firm at work on a NASA project, though he has no direct contractual relationship with the Government agency, surrenders any chance to have a device patented if it's a space age item.

The NASA patent rules "will restrict creative effort on the part of private industry," warns Robert Lent, director of marketing for Statham Instruments, Inc., of Los Angeles, developer and manufacturer of transducers, electromechanical devices that convert physical information to electrical impulses and transmit the impulses to electronic data handling equipment.

Mr. Lent claims the rules assume rockets and missiles won't be used in commercial way. He complains the rules recently caused Statham to pass up an order.

"A buyer for a major company that had taken a NASA R. & D. contract came to us and wanted transducers off the shelf. But because his firm was working on a NASA contract, I would have jeopardized the patent position of our transducers in accepting the order," Mr. Lent contends. He turned down the sale, and the buyer went to another supplier, the marketing director adds glumly.

A NASA official in Washington, citing the agency's provisions that allow the NASA administrator to waive the Government's patent rights, says it's not NASA's intention to apply the rules as severely as some industrial critics fear. Industry's objections to the patent provisions "are currently being considered," he says. "There will be changes," he predicts, "but how far they'll go we can't say."

EXHIBIT NO. XVII(F)

Excerpts from Final Report of House Small Business Committee (H. Rept. 2970, 84th Cong., 2d sess.).

Union Calendar No. 1222
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FINAL REPORT

OF THE

SELECT COMMITTEE ON SMALL BUSINESS
HOUSE OF REPRESENTATIVES

EIGHTY-FOURTH CONGRESS

PURSUANT TO

H. Res. 114

A RESOLUTION CREATING A SELECT COMMITTEE TO CONDUCT A STUDY AND INVESTIGATION OF THE PROBLEMS OF SMALL BUSINESS

JANUARY 3, 1957.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

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CHAPTER VI. GOVERNMENT SUBSIDIES FOR RESEARCH AND INDUSTRIAL ADVANCEMENT

In the technological revolution which American industry is presently undergoing, Government research and development expenditures may well prove to be the kiss of death for independent small business.

The Government is the biggest buyer of research

With the Government currently paying for almost two-thirds of all research and development, the disproportionate subsidy to bigness is contributing immeasurably to an already dangerous degree of industrial concentration.

Concerned about the long-range implications of the military procurement program which is geared to deal with big business, this committee has been especially distressed by the ominous shadow which is cast on the future with the monopoly of technology by big business.

Last year, in a supplemental statement to a subcommittee report on the Small Business Administration, the Honorable Joe L. Evins reiterated these fears. In that statement he stressed the potential danger to healthy competitive relationships which comes with the selective treatment which allows some firms to forge ahead of others in Government financed research.[1]

Because the Department of Defense is by far the biggest spender of research funds, its program is by far the most crucial in its economic effects. It spends at least 85 percent of all Federal funds which are spent for research, and almost all these funds go to private business firms. Persistently, this committee has sought information on the scope and pattern of Government research and development expenditures, in order to appraise that program and evaluate its impact on small business.

There is a statistical vacuum.—This matter of statistics was raised by our chairman in hearings before the Banking and Currency Committee on the extension of the Small Business Administration.[2] The SBA Administrator was asked what proportion of the Government's research and development contracts go to small business. The extent of the Administrator's information was that he believed the Navy was cooperative in trying to place some contracts with small business.

Subsequently, at our chairman's request, Mr. Barnes supplied a letter from the Assistant Secretary of Defense (Supply and Logistics) which provided some additional information.

That letter gave the total and the small-business share of research and development contracts for the Air Force in 1954 and for the Navy for part of 1955. The letter further stated that:

[1] Subcommittee No. 2, Preliminary Report on the Small Business Administration and Related Activities, July 1, 1955, p. 20.

[2] Hearings before the Committee on Banking and Currency, House of Representatives, Extension of the Small Business Act of 1953, May 1, 1955, pp. 76, ff.

> Similar data have not been compiled for other research and development contracts of the Navy Department, or for Army contracts in this category.
>
> We are investigating the possibilities of setting up a system for regular reporting of this kind of information * * *[3]

On May 12, 1955, our chairman, Mr. Patman, offered an amendment to the Department of Defense appropriation bill. That amendment would have required the Department of Defense to make monthly reports on the total amounts, and the small-business portion of all funds spent or contracted for procurement, and separately for research and development.[4] The amendment was defeated on a point of order.

In order that some minimum data might be kept available for at least perfunctory evaluation of the status of small-business participation, members of this committee recommended an amendment to the Small Business Act to require monthly reports of the Department of Defense, showing the amounts spent or contracted for research and development, and the proportion going to small business. The provision was accepted by the Banking and Currency Committee, and was written into the law which became effective August 1, 1955.

The reports are alarming

Upon receiving the first report as required by this provision, our chairman wrote in October 1955 to the Honorable Charles E. Wilson, Secretary of Defense, to call attention to the dangers of the Department's policies. He pointed out that for the 2 months covered by that report—July and August 1955—all but 95 percent of the $187 million Federal-research funds had gone to companies having more than 500 employees.

He further pointed out that the billion and a half dollars which DOD had been spending annually for research and development, which for all practical purposes was a subsidy to big business, was 100,000 times as great as the SBA's whole lending program, designed to assist small-business expansion.

Our chairman added:

> I am not asking you to subsidize small business, or to subsidize any business. But I am asking you to give thoughtful consideration to the consequences which will surely follow if you continue passing out the huge research and development funds, which have been placed at your disposal, exclusively to big business.

In his reply, Secretary Wilson wrote that he had asked his assistant, Mr. Pike, to answer our chairman's questions more fully.

The Department of Defense has not kept itself informed

Finally, in January, the more full answer came from Mr. R. C. Lanphier, Jr., Deputy Assistant Secretary of Defense.

Mr. Lanphier's letter indicated that the 95–5 percent distribution of research funds seemed eminently fair to the Department of Defense. Among the reasons for believing so, he pointed to a Harvard Business School report which found that 8 out of 10 small firms—those with less than 500 employees—have no research or development personnel

[3] Ibid., letter from T. P. Pike, Assistant Secretary of Defense (Supply and Logistics).
[4] Congressional Record for Mar. 12, 1955, p. 5309.

or facilities. Another reason was that BLS surveys indicate that "less than 10 percent of the research engineers and scientists in all commercial and nonprofit organizations are employed by small-business firms." [5]

On the face of it, the fact that only 20 percent of small firms have adequate personnel and facilities to contribute significantly to the program, and the additional fact that small concerns employ only 10 percent of the research engineers and scientists, would hardly indicate that less than 5 percent of the research and development subsidy to such firms represents a wholesome distribution of the subsidy.

Moreover, it might be pointed out that a principal reason many small firms have not hired personnel and developed research facilities is simply that they have not had the money to do so. Given the opportunity to share in Government research funds, small businesses could and would expand their facilities. The fact of present inequities is no defense for deliberately increasing the inequity.

Part of the problem is perhaps the natural impatience of the military, in whose chain of command efficiency is measured in terms of getting things done as quickly as possible with the least amount of high-echelon effort. This is not the efficiency of the economic world, where costs are part of the problem; and efficiency means getting the greatest amount of the lowest cost results. And while it may be easier in the immediate present to hand big business the research contracts on the basis of their ability to deliver more quickly, in the long run such a policy would be disastrous to the Nation. A cold-war defense buildup is a long-range project, and its success will ultimately depend on maintaining the economic health of the country. Small businesses, like men, may be expendable in the heat of all-out war. But a permanent policy which is wastefully destructive of small business is too staggering a cost to impose upon our economy. It, moreover, goes against the grain of the whole fabric of our political and social philosophies of independence and equal opportunity.

Members of Congress have expressed concern

This enormous concentration of Government research funds in the hands of a very few large corporations aroused considerable concern among Members of Congress who urged that the committee study the situation thoroughly. Addressing the House on May 9, 1956, for example, the Hon. Frank Thompson, Jr., pointed out that "the concentration of research contracts among the large companies is even greater than procurement contracts generally, and small-business concerns are for all practical purposes completely ignored." [6] Stressing the fact that the data which is currently available is largely attributable to the probing efforts of this committee, Representative Thompson urged the importance of keeping the Congress informed.

In November 1956, the Attorney General reported extensively on this subject of the Government contribution to research and development.[7]

One of the matters which that report stressed was the intimate interrelationship of research for defense purposes and research for civilian uses. By way of illustration, "Processed foods, electronic

[5] Letter, January 10, 1956, from R. C. Lanphier, Jr., Deputy Assistant Secretary of Defense (Supply and Logistics).
[6] Congressional Record for May 9, 1956, p. 7039.
[7] Report of the Attorney General, pursuant to sec. 708 (a) of the Defense Production Act of 1950, as amended (Nov. 9, 1956).

devices, and penicillin, to list only a few present-day commercial products, were all originally developed under research and development programs for defense purposes." [8]

The Attorney General has also expressed alarm

A second point was that private patent rights originating in publicly financed research confer a monopoly on those privileged to participate in the research program. The purpose of the report, therefore, was to consider "means whereby the Government's part in industry research, though part of the defense effort, may be channeled so as to best preserve the free competitive system." [9]

The report focused on the share of industry's research and development effort which is actually financed with Government funds. It pointed out, however, that of the roughly $7 billion spent annually for such purposes, only about $3 billion is financed by industry, and virtually all of the remainder is financed by the Government, mainly the Department of Defense.

In particular, it is the amount of $1.36 billion—over one-third of all industrial research, which is directly financed by the Government—which, in the opinion of The Attorney General "represents the most directly recognizable governmental subsidization of research and industry," and is of gravest concern as a contributor to further industrial concentration.[10]

The Attorney General commented critically on the vast statistical vacuum. A study made in 1952 by the Research Council of the National Academy of Sciences, for example, based its findings on data supplied by the Department of Defense. In the Attorney General's opinion, that study, which estimated $2.9 billion total research and development expenditures in 1952, as compared with $800 million in 1941, seriously understated recent expenditures—for example, the Department of Defense figures did not include substantial expansion in the atomic-research programs.

In 1955, the National Science Foundation [11] noted, in connection with research and development, a—

> * * * void in the basic data essential to sound planning. The first step toward policy formulation is necessarily the painstaking task of accumulating relevant data concerning the national effort in scientific research and development.[12]

The survey made by the National Science Foundation, which the Attorney General's report considered to be more accurate because it was based on direct questioning of industrial units, raised the National Academy of Science estimate of $2.9 billion total expenditures to a new estimate of $5 billion.

Moreover, the Attorney General's report noted two additional understatements of the Federal Government's contribution to research and development. First, the salary costs of military personnel engaged in research and development work should be included in an accurate accounting. And, secondly, the development work does not end with production of a prototype but almost invariably involves a series of

[8] Ibid., p. 6.
[9] Ibid., p. 9.
[10] Ibid., p. 18.
[11] Created by an act of Congress in 1950, 64 Stat. 149 (1950), 42 U. S. C., par. 1861 (1952).
[12] National Science Foundation, Fifth Annual Report, Fiscal Year 1955, p. 17 (1955).

tests and changes, all of which are part of research and development, and none of which are included in the accounting.

Lack of information is critical

The data problem, which is serious in all respects, is especially serious in terms of the industries involved. For measuring the apportionment of funds among industries, which is of primary concern in evaluating the effects on concentration, the Attorney General noted that the most critical lack of information exists in this area of activity, industry by industry.

After examining the benefits conferred on those selected for Government contracts, the report made several recommendations. Those benefits included the risk-free element of the cost-plus-fixed-fee basis, the foot-in-the-door advantage in obtaining subsequent research or procurement contracts, the advantage of subsequent commercial application, and the enormous advantages of having a working organization of top scientific personnel, a body of scientific know-how, and a generous patent policy.

A conclusion reached by the Attorney General was that, for the future of competitive enterprise, it is essential that the Government's program be designed to promote competition to the greatest possible degree consistent with the exigencies of the defense effort. In this connection, he expressed concern:

> * * * However, although there is inadequate factual material upon which to judge the effect of Government subsidization of research, what indications are available warn that the Government expenditures may not run counter to the industry trend toward concentration but in some degree may even reinforce it.[13]

In particular, the Attorney General concluded that two things need consideration: the possibility of the removal of certain practical obstacles to small business participation, and a reevaluation of the patent system to determine whether it would be more in the public interest for the Government to acquire the patents for whose development it pays.

For the obvious handicaps to small business resulting from capital and credit difficulties, inability to draw first-rank scientific personnel, and inadequate facilities for huge programs called for by the weapons-system concept of procurement, the report offered no solutions. For equally important, though less obvious handicaps, however, it made some recommendations. Among these was the suggestion that bid procedures might be simplified to cut the cost of preparing bids. Another was that more data should be accumulated on the availability of small firms and conversely that wider publication of possible projects be made. In addition, the element considered by some expert opinion to be the greatest single factor accounting for the miniscule small-business share is the burden of responsibility of the contracting officer. These officers, with little or no technical knowledge, tend to be cautious and to deal only with firms which have an established reputation. Practical removal of this obstacle would greatly improve the chances of small business.

[13] Report of the Attorney General, op. cit., p. 29.

Patent policy is a probable villain

In respect to patents, the Attorney General found that the limited statistical information presently available all points to the conclusion "that present policy may well be one of the major factors tending to concentrate economic power." [14]

Here it should be observed that Department of Defense awards its contracts for research and development under terms which assure the contractor a profit on the work done, and such contracts are without risk to the contractor. More specifically, the contracts are "cost-plus-fixed-fee," and upon exhaustion of the funds provided in the contract, the contractor may either abandon the work or, by custom, ask the Department for additional funds. In the case of research done by profitmaking firms, the Department makes almost no claim on the patentable fruits of the research. As a general rule the contracts require that the Government be given the opportunity to acquire the patent on what seems a patentable invention, only if the contractor does not wish to acquire the patent himself. In the latter event, the contracts merely call for the Government to receive a nonexclusive royalty-free license, leaving all commercial rights in the hands of the contractors themselves. Such licenses, moreover, are usually intended only as an assurance of sorts that if the Government later enters into procurement contracts for supplies which involve use of the patent, the price it pays for the items will not contain royalty payments to the patent-holder. This rather free-handed treatment of the patentable fruits of Government-financed research is explained as being part of the incentive which is offered to have the research done. Furthermore, the theory is that in many instances this incentive induces the contractor to agree to meet some specified portion of the cost of the research.

According to information which the Department of Defense has supplied the committee, contractors assigned licenses to the Government under 6,788 pending patent applications in the 5 years ended June 30, 1956, and assigned to the Government all rights in 1,520 inventions. Of these patents to which title was transferred to the Government, the Attorney General has said that the contractors "themselves were uninterested in filing patent applications, either because of questionable patentability or lack of any foreseeable commercial value." [15]

Referring to the great majority of cases in which the contractor did decide to acquire for himself the patent, however, the Attorney General said:

> While the issuance of a patent, of course, does not guarantee the commercial value of the inventions covered, this much at least is clear: a large number of inventions have resulted from Department of Defense-financed research projects, the commercial rights to at least 6,788 of which remain in private hands, and these 6,788 are inventions which research and development contractors, after careful screening by competent counsel, believe to be patentable and of sufficient commercial utility to be worth the expense of patent processing. [16]

[14] Report of the Attorney General, op. cit., p. 48;
[15] Op. cit., p. 27.
[16] Ibid.

A further study of these 6,788 patent applications by the Attorney General's staff reveals that 52 percent were filed by only 15 companies. Twelve of the companies are among the corporate giants, the smallest having a net worth of about $100 million.

A previous Attorney General recommended, in 1947, when Government grants for research were small by comparison to today's outlays, that the Government adopt policies by which patents arising from Government-financed research would become the exclusive property of the Government.

Recognizing that there is strong opposition to this recommendation—particularly as expressed in 1947 by the military—the present Attorney General has strongly urged the need for sufficient data to permit an evaluation of the whole issue. His report concluded, moreover, that whatever the merits of private claims on patents arising out of Government-sponsored research, the maintenance of a freely competitive economy is of the first order of importance. If the apparent trend toward concentration is borne out by a full review of the facts, this would constitute a strong argument in favor of Government ownership of all such patents, available to all applicants under nonexclusive licenses.

At all events, the Attorney General stressed, as this committee has consistently stressed, the urgent need for information which will throw light on the effects of present policies in this field.

RESEARCH AND DEVELOPMENT PRIME CONTRACT AWARDS AS REPORTED BY THE DEPARTMENT OF DEFENSE

In response to this committee's request, the Department of Defense has now compiled reports showing the names of the 500 largest recipients of military funds awarded for experimental, developmental, and research work in each of the 3 fiscal years 1954–56. These reports also show the net value of the awards to each contractor in each year. These data are subject to the qualification—thought to be slight—that for the fiscal year 1954 they include only those contracts and other "procurement actions" in amounts of $50,000 or more; and in the later 2 years they cover only such "procurement actions" of $10,000 or more.

Research and development contracts are concentrated in a few very large firms

Over the entire 3-year period, these contracts amounted to $4.771 billion. The 3-year total of net awards to 500 largest prime contractors in each of the 3 years amounts to $4.681 billion, which was 98.1 percent of all research and development contracts. While these totals omit contracts in the small amounts specified above, it is believed that the inclusion of such small contracts would not significantly change the proportions.

More specifically, the proportions going to the 500 largest contractors in each of the 3 fiscal years were as follows:

[Amounts in billions]

Year	Total research and development contracts	Amount to 500 largest contractors	Percent to 500 largest contractors
			Percent
1954	$0.952	$0.944	99.2
1955	1.417	1.379	97.3
1956	2.402	2.358	98.2
3-year total	4.771	4.681	98.1

Source: Department of Defense.

Large firms get the subsidy

The point should be made that the list of the 500 largest contractors was not, in all cases, the same firms in each of the 3 fiscal years. The more significant point is, however, that the firms disappearing from, or appearing anew on the lists of 500 largest, as between the 3 years, were for the most part the very small contractors accounting for only a minor percentage of the total funds involved.

In order to provide a more systematic appraisal of this matter, amounts of the awards to each contractor appearing on the lists of 500 largest, in any of the 3 years, have been consolidated, so as to present a 3-year total for each contractor. Then on the basis of the consolidated data, contractors have been ranked in order of their 3-year totals. Finally, an examination has been made of the list of the 300 largest recipients of these awards in the 3-year period. By this analysis it is found that the 100 top recipients of awards of research and development funds in the 3-year period accounted for 85 percent of the value of all the research and development contracts awarded in that period; the 200 top recipients accounted for 91 percent of the total; and the 300 top recipients accounted for 94 percent of the total. Thus it is apparent that these research and development funds awarded in the 3 years were highly concentrated in the 100 top contractors; and that substantially all of these funds (94 percent) went to only 300 contractors.

Among these 300 largest recipients of Department of Defense contracts for research and development, 239 have been identified as what appear to be private, profitmaking organizations. These include, incidentally, most of the familiar names among the top industrial corporations of the country. Conversely, the remaining 61 organizations have been identified as what appear to be educational institutions and nonprofit organizations. While the 300 organizations combined accounted for 94 percent of all the funds contracted in the 3 year period, the 239 top profitmaking organizations received 85 percent of all the funds, and the universities and other nonprofit organizations received slightly less than 9 percent of the total. The names of 239 profitmaking firms are shown in table 23a, along with the amount of the research and development funds awarded to each firm; and similar information is shown in table 23b for the 61 nonprofit organizations.

It should be noted, particularly with reference to the list of profitmaking firms, that the reports supplied by the Department of Defense have in a number of instances listed parent corporation separately from its subsidiaries. For example, the Western Electric Co. (which

ranks as the third largest receiver of research and development awards) is listed separately from its corporate parent, A. T. & T., which appears much further down the list. If and when consolidated reports are prepared, they will of course show an even greater concentration of the research and development funds than has been indicated.

TABLE 23 (a).—*300 companies and institutions receiving largest amounts of military research and development contracts in the fiscal years 1954–56* [1] *(parent corporations and subsidiaries are not consolidated)*

[In thousands]

North American Aviation	$420, 712
General Electric Co	338, 102
Western Electric Co	264, 195
Boeing Airplane Co	211, 567
Hughes Aircraft	203, 009
General Dynamics	146, 978
Martin, Glenn L., Co	136, 225
Bell Aircraft Corp	133, 723
Aerojet General	115, 074
Westinghouse Electric	105, 483
Northrop Aircraft, Inc	105, 174
Curtiss-Wright Corp	98, 426
Radio Corporation of America	87, 639
Lockheed Aircraft Corp	84, 253
Sperry-Rand Corp	83, 230
Raytheon Manufacturing Co	70, 844
United Aircraft Corp	67, 373
Radioplane Co	57, 572
General Motors Corp	42, 254
International Business Machines	39, 761
Douglas Aircraft Co., Inc	39, 449
AVCO Manufacturing Co	37, 206
Chrysler Corp., Plymouth	34, 717
Bendix Aviation Corp	34, 289
McDonnell Aircraft Corp	32, 396
Chance Vought Aircraft	31, 708
Republic Aviation Corp	29, 530
Fairchild Engine & Airplane Corp	24, 810
Minneapolis Honeywell	23, 906
International Telephone & Telegraph	22, 802
Olin Mathieson	21, 799
Consolidated Vultee	21, 685
Sylvania Electric	21, 315
Thiokol Corp	21, 264
Philco Corp	19, 953
American Machine & Foundry Co	19, 288
ACF Industries	19, 225
Ryan Aeronautical	16, 944
Aro, Inc	16, 311
Hercules Power Co	16, 024
Reaction Motors	14, 942
Ford Motor Co	14, 854
Goodyear Tire & Rubber Co	14, 363
Marquardt Aircraft Co	14, 329
Collins Radio Co	14, 275
Piasecki Helicopter	14, 235
American Telephone & Telegraph	14, 200
Ramo Wooldridge Corp	14, 168
Melpar, Inc	13, 524
Vitro Corporation of America	13, 078
Eastman Kodak Co	12, 923
Continental Aviation	12, 610
Cook Electric Co	12, 413
Rheem Manufacturing Co	12, 142

See footnote at end of table.

TABLE 23 (a).—*300 companies and institutions receiving largest amounts of military research and development contracts in the fiscal years 1954–56* [1] *(parent corporations and subsidiaries are not consolidated)*—Continued

[In thousands]

Gilfillan Bros., Inc	$11, 673
Motorola Comm-Electric	11, 508
Callery Chemical Co	11, 356
Aerophysics Development Corp	11, 006
Detroit Controls	10, 733
American Bosch Arma Corp	9, 818
Parsons, Ralph M., Co	9, 330
Illinois Institute of Technology	9, 036
Maxon, W. L., Corp	8, 988
Northern Ordnance, Inc	8, 458
Grumman Aircraft Engineering	8, 258
Stroukoff Aircraft Corp	8, 231
Burroughs Corp	7, 991
Airborne Instrument Laboratory	7, 399
Stavid Engineering, Inc	7, 162
General Mills, Inc	7, 082
Glenco Corp	6, 858
Radiation, Inc	6, 850
Garrett Corp	6, 814
Phillips Petroleum Co	6, 647
Hallicrafters Co	6, 298
Belock Instrument	6, 292
Kearfoot Co., Inc	6, 283
Aircraft Armaments	6, 064
All American Engineering	5, 997
Cubic Corp	5, 971
Coleman Engineering Co	5, 875
Reeves Instrument Corp	5, 715
Pachmayr Corp	5, 141
Emerson Radio	5, 037
General Tire & Rubber Co	4, 943
Rohm & Haas Co	4, 933
Continental Motors	4, 876
Land Air, Inc	4, 876
Link Aviation, Inc	4, 728
Firestone Tire & Rubber Co	4, 697
Food Machinery & Chemical Corp	4, 615
Century Engineering, Inc	4, 570
Perkins-Elmer Corp	4, 527
Electronic Engineering Co	4, 466
Metal Hydrides, Inc	4, 388
Magnavox Co	4, 249
Beech Aircraft Corp	4, 106
Sverdrup Parcel Inc	4, 053
Bulova Research Laboratory	4, 048
Du Mont (Allen B.) Laboratories	4, 030
Eagle Picher Co	3, 941
Lab for Electronics	3, 924
Hazeltine Electric Corp	3, 889
Horning Cooper, Inc	3, 862
Sanders Association	3, 854
Clevite Corp	3, 832
Little, A. D., Inc	3, 723
Norden Ketay Corp	3, 711
Norden Labs	3, 690
Engineer Research Association	3, 574
Continental Electronics Manufacturing Co	3, 517
Varian Association	3, 294
Michigan State College	3, 276
Polytechnic Institute of Brooklyn	3, 260
Armour Laboratories	3, 231

See footnote at end of table.

TABLE 23 (a).—*500 companies and institutions receiving largest amounts of military research and development contracts in the fiscal years 1954–56* [1] *(parent corporations and subsidiaries are not consolidated)*—Continued

[In thousands]

Studebaker Corp	$3, 208
Litton Industries	3, 185
Librascope, Inc	3, 163
Tracer Laboratories	3, 074
Hycon Manufacturing	2, 974
Lear, Inc	2, 906
Baird Association, Inc	2, 849
Canoga Corp	2, 798
American Locomotive Co	2, 740
Alfred, A., consulting engineer	2, 676
Emerson Electric Co	2, 649
Kollsman Instrument Corp	2, 615
Catalyst Research Corp	2, 503
Mine Safety Appliance	2, 496
Kellogg, M. W., Co	2, 485
Harvey Machine Co	2, 415
Experiment, Inc	2, 324
Development Engineering Corp	2, 321
United Shoe Machine	2, 294
Solar Aircraft Co	2, 286
Remington Rand, Inc	2, 260
Propulsion Research Corp	2, 253
Jackson & Church	2, 232
Wetmore Hodges & Association	2, 204
Hoffman Labs, Inc	2, 113
Atlantic Research Corp	2, 102
Bermite Powder Co	2, 096
Parsons Aerojet	2, 087
Reynolds Metals Co	2, 061
Carnegie Institute of Technology	2, 048
Daystrom Electric Corp	2, 042
Aeronautical Radio	2, 022
A. R. F. Product, Inc	2, 009
General Electronics Laboratory	1, 989
I. T. E. Circuit Breaker Co	1, 948
General Precision Equipment	1, 942
Texas Instrument, Inc	1, 930
White-Rodgers Co	1, 918
Bulova Watch Co., Inc	1, 909
Picard Burns	1, 908
General Precision Laboratory, Inc	1, 866
Eitel-McCullough, Inc	1, 840
Anderson-Nichols Co	1, 837
Photoswitch, Inc	1, 818
Admiral Corp	1, 765
Chamberlain Corp	1, 739
FADA Radio Electric Co	1, 725
Stanley Aviation Corp	1, 720
Hiller Helicopter	1, 716
Polorad Electric Products	1, 704
Technitrol Engineering Co	1, 680
Horizonz, Inc	1, 675
Kaman Aircraft Corp	1, 669
RCA Service Co	1, 642
Jered Industries	1, 637
Lenkurt Electric Co., Inc	1, 623
International Harvester	1, 604
Hamilton Watch Co	1, 594
Technical Products Co	1, 592
Thiebolt Aircraft	1, 576
Austin Co	1, 558

See footnote at end of table.

TABLE 23 (a).—*300 companies and institutions receiving largest amounts of military research and development contracts in the fiscal years 1954–56* [1] *(parent corporations and subsidiaries are not consolidated)*—Continued

[In thousands]

Vertol Aircraft Corp	$1,555
Consolidated Electrodynamic	1,547
Stewart Warner Corp	1,544
Pacific Car & Foundry	1,516
Instruments for Industry	1,511
Technical Operations, Inc	1,508
Electronics Corporation of America	1,507
Mallory-Sharon Titanium Corp	1,505
Standard Oil Company of Indiana	1,503
LeTourneau, R. G., Inc	1,463
Fairbanks, Morse Co	1,448
Associated Engineers	1,412
Grand Central Rocket	1,411
Smith (A. O.) Corp	1,410
Haloid Co	1,384
Air Reduction Co., Inc	1,359
Fairchild Camera	1,358
Thompson Products, Inc	1,358
Bomac Laboratory	1,335
Allis-Chalmers Manufacturing	1,331
Globe American Corp	1,329
Reflectone Corp	1,313
Norris Thermador Co	1,309
Bowen McLaughlin	1,263
Washington University	1,256
Union Carbide & Carbon	1,236
Telecomputing Corp	1,208
Temco Aircraft Corp	1,193
Allied Research Association, Inc	1,179
Farrand Optical Co	1,153
Ten Bosch M., Inc	1,153
General Electric Supply Corp	1,150
National Fireworks, Inc	1,146
Brooks Perkins, Inc	1,118
Alloy Engineering & Casting Co	1,115
Cessna Aircraft Co	1,111
Goodrich, B. F., Co	1,104
Mergenthaler Linotype	1,089
Corvey Engineering Co	1,076
Mallory, P. R., & Co	1,071
International Telemeter	1,065
Chicago Aerial Industries	1,065
Air Association, Inc	1,058
Parke Thompson Association	1,055
Nems Clarke, Inc	1,047
National Co., Inc	1,027
EDO Corp	1,007
International Electronics	1,006
Grand Central Aircraft	1,000
United States Rubber Co	1,000
Pullman Standard Car Manufacturing Co	1,000
Electronic Corp	988
Minnesota Mining & Manufacturing	983
Elgin National Watch Co	983
Cincinnati, University of	980
Beers-Heroy	978
Pittsburgh, University of	977
Trans-sonic, Inc	972
General Development Corp	960
Bristol Engineering Corp	958
Thompson, John I. Co	945

See footnote at end of table.

TABLE 23 (a).—*300 companies and institutions receiving largest amounts of military research and development contracts in the fiscal years 1954–56* [1] *(parent corporations and subsidiaries are not consolidated)*—Continued

[In thousands]

Four Wheel Drive Auto	$945
Titanium Metals Corporation of America	934
Designers for Industry	917
Edgerton, Germeshausen & Grier	914
Air Products, Inc	913
H. L. Yoh and Co	903
Total 239 firms	4,066,472

[1] Totals for the 3 fiscal years are comprised of "procurement actions" of $50,000 or more in fiscal 1954, and "procurement actions" of $10,000 or more in fiscal 1955 and 1956.

Source: Department of Defense.

TABLE 23 (b).—*Amount of Department of Defense research and development fund* [1] *awarded to nonprofit organizations, educational institutions, and Government agencies which were among the 300 largest recipients of such funds in the fiscal years 1954–56*

Total (61 organizations and agencies):	*Amount (in thousands)*
Massachusetts Institute of Technology	$61,169
California Institute of Technology	50,673
Johns Hopkins University	38,695
Cornell Aeronautical Laboratory, Inc	24,814
Rand Corp	21,462
University of Michigan	16,023
Columbia University	11,576
Stanford University	10,201
University of California	9,865
Battelle Memorial Institute	9,794
University of Illinois	9,290
Illinois Institute of Technology	9,036
U. S. Atomic Energy Commission	8,779
University of Chicago	8,135
University of Minnesota	8,122
Stanford Research Institute	7,442
University of Texas	5,996
Ohio State University	5,760
University of Pennsylvania	5,251
George Washington University	5,091
Pennsylvania State College	5,060
New York University	4,569
Princeton University	4,388
Harvard University	4,201
Woods Hole Oceanographic Laboratory	3,904
Franklin Institute	3,741
Armour Research Foundation	3,424
Michigan State College	3,276
Polytechnic Institute of Brooklyn	3,260
Armour Laboratories	3,231
U. S. Department of Commerce	3,163
National Academy of Sciences	2,796
University of Denver	2,795
Cornell University	2,554
University of Washington	2,519
Southwest Research Institute	2,244
New Mexico College of Agricultural and Mechanical Arts	2,081
Carnegie Institute of Technology	2,048
Georgetown University	1,932
Midwest Research Institute	1,896
Yale University	1,657
Purdue Research Foundation	1,607
Boston University	1,516

See footnote at end of table.

TABLE 23 (b).—*Amount of Department of Defense research and development funds* [1] *awarded to nonprofit organizations, educational institutions, and Government agencies which were among the 300 largest recipients of such funds in the fiscal years 1954–56*—Continued

	Amount (in thousands)
University of Dayton	$1,475
Brown University	1,469
University of Florida	1,406
Syracuse University	1,309
University of Wisconsin	1,308
University of Maryland	1,307
Case Institute of Technology	1,279
Tufts College	1,267
Washington University	1,256
American Institute of Research	1,198
New Mexico Institute of Mining and Technology	1,198
Duke University	1,177
Georgia Institute of Technology	1,164
University of Utah	1,136
Georgia Technical Research Institute	1,124
University of Alaska	1,102
University of Southern California	1,077
University of Colorado	1,029
Total, 61 firms	412,828

[1] Amounts for the 3 fiscal years are comprised of contracts awarded and other procurement actions, in amounts of $50,000 or more in the fiscal year 1954 and in amounts of $10,000 or more in the fiscal years 1955 and 1956.

Source: Compiled from reports supplied by the Department of Defense.

Senator LONG. The record will be kept open for a period of 2 weeks for the filing of additional statements with the committee. These will be included in the appendix. We will adjourn subject to the call of the Chair.

(Whereupon, at 4:10 p.m., the subcommittee adjourned, subject to the call of the Chair.)

APPENDIXES

APPENDIX I

SUPPLEMENTAL MATERIAL SUBMITTED BY PROF. DANIEL HAMBERG

UNIVERSITY OF MARYLAND,
COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION,
DEPARTMENT OF ECONOMICS,
College Park, December 11, 1959.

Senator RUSSELL B. LONG,
Chairman, Subcommittee on Monopoly,
Senate Small Business Committee,
Old Senate Office Building, Washington, D.C.

DEAR SENATOR LONG: In compliance with your request at the hearings, Tuesday, December 8, I am enclosing a copy of the paper I presented to the Joint Economic Committee on September 24, and a table containing the most recent data on the proportion of industry research and development costs financed by the Federal Government.

I am glad that I have been able to be of some assistance to you in your investigation of an extremely important problem.

Cordially yours,

D. HAMBERG,
Professor, Economics Department.

P.S.—Enclosed also is a slightly expanded version of my opening statement at the December 8 hearings which I am having inserted into the record in place of my original opening statement.—D. H.

APPENDIX I (A)

Percent of industrial research and development costs financed by the Federal Government, 1957

	Percent
All industries	52
Industrial chemicals	9
Drugs, medicines, and other chemicals	1
Petroleum refining and extraction	4
Stone, clay, and glass	1
Fabricated metal products	38
Nonelectrical machinery	38
Electrical equipment	61
Motor vehicles and other transportation	30
Aircraft and parts	85
Scientific and mechanical measuring instruments	30
Optical, surgical, photographic, and other instruments	29
Other manufacturing	23
Communcations	54
Other nonmanufacturing	6

NOTE.—Total research and development costs in industry, 1957, $7.2 billion. Federal research and development disbursements to industry, 1957, $3.7 billion.

Source: National Science Foundation.

APPENDIX I(B)

SIZE OF FIRM, MONOPOLY, AND ECONOMIC GROWTH

(D. Hamberg, University of Maryland)

(Statement presented to the Joint Economic Committee on September 24, 1959, in connection with the committee's study of employment, growth and price levels.)

For a number of years we used to be treated to the defense of giant, plural-unit corporations, with monopoly powers, on the grounds that these were needed to achieve the economies of mass production made possible by modern technology. This argument always suffered from a certain lack of conviction, though, if for no other reason than the fact that in numerous cases the giant firms represented amalgamations of other firms that by any measure had been large and efficient corporations unto themselves—witness, for example, the absorption of Carnegie Steel by United States Steel. Empirical support for this argument was also hard to obtain. Other reasons centered on the widespread belief that most of the economies of mass production were to be found in the large-scale plant, as opposed to the large firm. This belief seemed to gain support from the efforts of some of the largest firms to decentralize many of their operations to the point where individual plants or subdivisions were encouraged to compete with one another.

Failing to carry the day on "cost" grounds, the defenders of giant corporations and monopoly power have more recently been treating us to another brand of argument. Starting with the pronouncements of the late Professor Schumpeter in the thirties and forties, we have been told that monopoly, far from being undesirable, is actually advantageous when economic progress is taken into consideration. In general, the case rested on the thesis that substantial monopoly power created an environment propitious to both capacities and incentives for innovation. We shall examine this argument in the second half of the present paper.

First, however, we want to deal with another form of sanction of big business and monopoly power that has captured the popular imagination. This comparatively new apologia may be set forth as follows: The independent inventor is now passé. In his place has come the giant corporations as the cradles of invention; only these great firms possess the resources to finance the skilled teams of scientists and engineers, working in splendidly equipped laboratories, that are now the providers of new production methods and new products. In short, inventions are believed no longer to originate in cold, barren garrets; instead, they are now the product of institutionalized research carried on by teams of experts working on preassigned projects whose results are preordained.

Not only has the independent inventor been swept aside by the invention of new ways of inventing, the argument continues, but the small and medium-size firms are also losing out in this process. Those who may be concerned about the monopoly powers of the giant corporations are assured that this is a small price to pay for the contributions to technology, and consequent improvements in our living standards and overall power, that the corporate giants are now making.

The above is an important and influential line of thought, and no doubt many readers will find themselves in agreement with it. Nevertheless, although there is undeniably a basic element of truth in this view, it is easily, and indeed has been, greatly exaggerated. It will be my task in the first half of this paper to try to place some perspective on this issue and to sound some warning notes against too-ready acceptance of the argument of the two preceding paragraphs, both on the grounds of what is and what ought to be.

A good way to go about this task is to seek the answer to four related questions:

(1) Is it true, really, that technical development is now the exclusive preserve of the teams of scietists and engineers working in the research laboratories of the giant concerns?

(2) Do the large corporations in fact finance the bulk of modern research activity?

(3) Has large size per se been a guarantee of serious interest in research, so that we have reason to look to an important effset in the form of progress to the monopoly powers of the giant firms?

(4) To what extent is large business size a necessary condition of modern research, and under what conditions?

The answers to these questions should not only cast in a true light the respective roles of the giant firms, the small- and medium-size ones, and the independent as sources of invention, but they may also tell us something about the reputed need for large-size firms in the modern realm of inventions.

The sources of inventions

As we have noted, the belief that large business size and economic progress go together rests considerably on the conviction that invention is now the exclusive domain of the giant corporations. How accurate is this view? A recent study of 61 important inventions made since 1900 discloses that more than half were the product of independent inventors, working alone, unaffiliated with any industrial research laboratories.[1] Among these were such diverse inventions as air conditioning, automatic transmissions, Bakelite (the first commercial plastic), power steering, catalytic cracking of petroleum, the cottonpicker, cellophane, the gyrocompass, the heliocopter, the jet engine, quick freezing, streptomycin, insulin, and the continuous casting of steel. Stainless steels were discovered almost simultaneously by an independent inventor and a member of a research laboratory.

In addition, several important inventions have been the product of research conducted in the laboratories of small- to medium-size firms. These include terylene (one of the great synthetic fibers), the crease-resisting process for fabrics, DDT, the continuous metal-casting process, as well as the continuous hot-strip rolling of steel sheets and shell molding.

In short, a total of 40 inventions out of the group of 61 selected as a sample of important inventive activity since 1900 have been the product of research carried on by the independent inventor or in the research laboratories of relatively small firms. Assuming the sample of 61 inventions is reasonably representative of major inventive activity in the current century, these figures certainly cast serious doubt on the thesis that technological progress is now the bailiwick of the large numbers of research workers employed in the great laboratories of the big firms.

Further indications along these lines have recently been provided by another study based on a sample drawn from U.S. patent data.[2] This study shows that 40 percent of the patentees were not technologists, and, therefore, were presumably not in the employ of research laboratories. In addition, only some 40 percent of the patentees were full-time, hired inventors, the remaining having been line technologists, executives, or individuals employed in divers occupations, all ostensibly devoting their leisure time to their inventions. In other words, 40 to 60 percent of the patentees could probably be said to have worked outside the organized teams of research workers of the industrial research laboratories, figures that appear to correspond with the findings of the study cited earlier. Corroboration of this statement is suggested by the patent-study finding that some 50 percent of the patentees were not college graduates, and it may also be presumed that this group would not be among the skilled teams of the industrial research laboratory.

These percentages are borne out by the basic patent statistics themselves. These statistics disclose that 40 to 50 percent of patented inventions are the product of the work of independent inventors.[3] Moreover, preliminary results of a study being conducted by the present writer of 45 important inventions made between 1946 and 1955 also lend strong support to the percentages cited in the preceding paragraph; if anything, they seem to show an even larger proportion of important inventions originating outside the research laboratories of the giant corporations.

All this is not meant to denigrate the contributions of the industrial laboratories of the large firms; the latter have been responsible for some very important

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[1] See J. Jewkes, D. Sawers, and R. Stillerman, "The Sources of Invention" (London: Macmillan & Co., Ltd., 1958), pp. 82 ff.

[2] Jacob Schmookler, "Inventors Past and Present," Review of Economics and Statistics, August 1957.

[3] It is worth noting that the basic patent statistics contain a strong and misleading numerical bias toward corporation-sponsored inventions. For the large corporations tend to be mainly responsible for a proliferation of patents on quite marginal variations on original, basic inventions. Among the reasons for this are a desire to maintain control over earlier patents and a desire to create roadblocks for competitors. One corporate director of research has said that as a result of indiscriminate patenting by large corporations, corporate patents involve much less true invention than those of independent inventors and should, therefore, be discounted.

inventions. Nylon, of course, was the product of the immense research facilities of the Du Pont laboratories, and if these did not discover cellophane (an individual did that), they were responsible for the development of its present moisture-proof qualities. The General Motors laboratories discovered Freon refrigerants and tetraethyl lead and were responsible for the final developments of the deisel-electric locomotive that made it commercially feasible (although the work had already been done by two small firms that were absorbed by General Motors, along with some of the most experienced workers in the field). The fabulous transistor was the product of the Bell Telephone Laboratories. And so on. Altogether, about 11 of the 61 important inventions mentioned earlier may be traced to the work of teams working in the industrial laboratories of large firms.

Yet, even in many of these cases, like television, silicones (materials whose characteristics remain unchanged through wide variations in temperatures), and Plexiglas, much of the basic research had already been performed by individual inventors working alone or in laboratories of small firms or specialized research laboratories. All this evidence combined seems to tell us that those who believe that the great industrial research laboratories of the giant firms are now the primary leaders along the path of technical advance in our brave new world have a seriously distorted view of things. There is little doubt that the laboratories are much more important in this century than they were in the last one, but apparently they are a far cry from having become the chief source of (qualitatively important) inventions.

Some statistics on research expenditures

It might be well to look at some of the data on expenditures for research to place the role of large business-financed research in better perspective. First, let us note that in the United States in 1957 about $9 billion were spent on research and development. Of the $9 billion figure, at least a half and possibly as much as two-thirds was spent by the Federal Government, mostly for defense purposes. Over half of this Federal spending was used to finance research and development carried on in the private sector of the economy. This information explains why more than half of private research is found in the aircraft, electronic and electric equipment, atomic energy, and guided missile industries. "In the United States, 84 percent of corporation expenditure in aircraft is met by the Federal Government; in electrical equipment, 54 percent; in scientific instruments, 45 percent; in telecommunications and broadcasting, 52 percent. * * * In nonsubsidized research and development about one-half of the expenditure is to be found in chemicals, electrical and other machinery, and petroleum refining." [4]

What inferences can we draw from these data? For one thing it seems clear that the prodigious increase in corporate research and development spending since 1940, about which so much has been heard, has been largely the result of Government financing for defense reasons. Further, most of this spurt in research activity has been concentrated in relatively few industries, largely those with defense connections. That is to say, most manufacturing industries and firms have not shared in this spectacular growth in spending on research and development. In fact, other data show most manufacturing firms, large and small, carry on very little of this activity; they concentrate on manufacturing.

Even in the few industries where corporate research is carried on in a big way, in view of the stimulus that they have received from Federal financing, what can we expect from them in the future? Some may assert that war preparations are here to stay, so that we can look forward to a continued strong interest in research from these groups, and the large firms, with their wonderfully equipped laboratories and skilled research personnel, will lead the way into the technological future. In part, the element of truth in this assertion depends on the length of time cold (and hot) wars will indeed remain with us, and this is a (political) question beyond our purview. It also remains to be seen to what extent defense-connected industries hold the torchlight to future technical developments.

Others will insist that even if the Federal Government steps out of the financing picture, the firms who are now spending on research in a big way will get in the habit of doing so, and will continue to do it in the future. Again, this may or may not be true. Certainly, there is room for some skepticism. Inviting caution on this point are the number of instances of firms that were quite aggressive

[4] Jewkes et al., pp. 148, 152.

in their research interest and spending at one time and lapsed into a state of semisomnolence at another. Once the Government stops footing the bill, there is always the possibility that the comptrollers and accountants with their everlasting myopic attitudes toward research, will find continued large-scale spending in this direction wasteful and expendable. This, too, has happened before, and it can happen again.

Does large size per se lead to interest in research?

Among those who believe that large size and technical progress have become as one, there seems to be the implicit notion that all or most giant firms have become sponsors of industrial research. Our previous discussion of the comparatively small proportion of important inventions since 1900 emanating from the giant corporations should be enough to cause strong skepticism on this score. Beyond that, we need only note a number or important industries dominated by very large firms where interest in research has traditionally been at a minimum. The steel industry is a notable case in point. Since the turn of the century, this industry (particularly the largest firms) has not been noted for its progressiveness. Virtually all the important recent advances in the methods of producing primary steel have come either from outside the industry or from small firms within the industry. Continuous hot-strip rolling and the oxygen converter were developed by small firms; continuous casting and planetary mills were created by independent inventors;[5] the same was largely true of the evolution of processes for using taconite ores (low grade ores constituting an almost unlimited supply of iron). And as noted in footnote 5, in some of these cases the large firms have strongly resisted the adoption of these new techniques.

But there is no need to dwell on the steel industry. It has been said of the cigarette industry, than which it is difficult to find larger size and more concentrated production, that its firms are almost totally innocent of any serious interest in research. In the equally if not more concentrated auto industry, it is fair to say that most of the recent engineering improvements have come from without the large firms of this industry. Many, like the new suspension systems, were pioneered by small European concerns, and others, like the automatic transmissions and power steering, were largely the results of the work of independent inventors. Again, during the years when the aluminum industry was a virtual monopoly of Alcoa, two of the three most important advances in production methods originated outside the industry. In the basic metal industries generally, where firms tend to be quite big, relatively little is spent on research. The same is true of the food products and agricultural machinery industries, both dominated by large firms. And so on through such similar industries as linoleum, plumbing equipment, meat products, distilled liquors, etc.

Certainly, there are industries where the typical firm is large and interest and spending on research intense, such as the aircraft, (heavy) electrical equipment, chemicals, and petroleum. But again, note that the first two of these have been the recipients of heavy Government financing. More important, however, the large number of cases that can be cited where large firms have by no means been in the vanguard of developing technology is proof enough that large size per se is no guarantee of large-scale spending on research and development,[6] and exceptional progressiveness. The fact that manufacturing industries where very large firms predominate have displayed no greater increases in output per man than other manufacturing industries is additional testimony to this fact. So is the tendency of large companies to get into new fields by absorbing smaller ones who have already made substantial progress

[5] It is worth noting that three of these new processes just mentioned threaten to revolutionize our conception of the steel industry as one involving gigantic plants (and firms) that are irreducible in size and hence virtually inconsistent with much competition. With existing techniques of producing primary steel prevailing in the United States, the costs of plant and equipment per ton of steel fall within an estimated range of $300 to $400 per ton. This is the capital cost of primary steel as it goes through the open hearth, blooming, and conventional finishing mills. However, it has been reliably estimated that with the replacement of the open hearth by the oxygen converter, the blooming mill by the continuous casting process, and the conventional finishing mill by the so-called planetary mill, these capital costs could be reduced to some $65 per ton. Yet, it is interesting that, despite widespread adoption of these processes in Western Europe and Russia, the steel industry in the United States has shown virtually no interest in them, with the possible exception of the oxygen converter.

[6] A more detailed statistical confirmation of this conclusion is provided by Jewkes, Sawers, and Stillerman, op. cit., pp. 156–157, and tables III, IV, V, VI, VII, pp. 193–196.

and possess the men with know-how. General Electric got into the electric-range and electric-clock fields in this way, as did General Foods in moving into the frozen-food market, and General Motors in becoming the chief producer of diesel-electric locomotives, to name but a few examples.

Is large size a necessary condition for modern research?

The discussion in the last section indicates that large size is clearly not a sufficient condition for interest and spending on research in the modern world. On the other hand, can it be said that large size is still a necessary condition? Would breaking up the large corporations, for example, be tantamount to depriving us of the "major" source of research into new techniques and products that will pave the way for future economic progress? In a sense, our earlier examination of the sources of inventions implies a negative answer to this question. But the persistence of unsubsidized research in certain industries, like the chemical and petroleum refining industries, both characterized by very large firms, suggests that in some cases there may indeed be some connection between expenditures on research and size of firm.

This connection seems to lie in fields of research or invention where the path to success is not a systematic one, but rather rests on a protracted and expensive series of experiments and tests. The element of chance assumes a large role as the researchers play a hunch that on the basis of known properties of certain elements or compounds (or soil and bacteria cultures), other compounds or molds (as in the cases of the antibiotics) with desirable properties can be found. Or often, a long series of tests may be performed in the mere hope of discovering unknown properties of certain compounds that will yield useful applications. A knowledge of science may be helpful in narrowing the range of experiments that must be performed in these cases, but perhaps only from 100,000 to 10,000 experiments.

This information may come as a surprise to many who believe that modern science and technology has lost its (supposedly) hit-or-miss qualities of the past, and is now on such a systematic basis that its results are foreordained. Yet a number of important dicoveries have been made in recent decades that have been matters of chance observation arising in the course of a search among many possibilities. These discoveries include such products as tetraethyl lead, Freon refrigerants. Doco lacquers, polyethylene, penicillin, streptomycin, and numerous others.[7]

The significance of research of this type for the problem at hand is not hard to discern. When inventions or discoveries involve innumerable observations from a long series of experiments, teams of research workers, with ample and some times elaborate research facilities at their disposal, may provide the fastest and most efficient way of achieving results. For "the ground to be covered can sometimes be methodically divided between different workers, and teamwork may be of greater value since the accumulation of negative results is one method of finally identifying the correct line of attack."[8] Here, then, the financial resources of the big firm may be required to provide both the facilities and the teams of workers. Moreover, where the element of chance is great, the large firm is in a better financial position to absorb the costs of the many failures involved before success is achieved.

However, we must not exaggerate the potential of the large firm in this respect. For one thing, the kind of expensive experimentation just described appears to apply mainly to chemical and related inventions. For another, this type of research is not new, and has been successfully conducted in the past by individuals or small teams of workers utilizing a bare minimum of equipment. This was true in connection with the discovery of the first aniline dye and the vulcanization of rubber in the previous century, for example, and of Freon refrigerants, tetraethyl lead, and nylon in the 20th century. In fact, some of the very large firms operate a number of small laboratories rather than one large one. This indicates, on the one hand, that there are often serious disadvantages to the very large laboratory and big teams (for reasons to be discussed), and on the other hand, that comparatively small firms can afford laboratories of their own. Supporting the latter statement is the information that "in the United States the average operating cost of a laboratory per research engineer or scientist is about $25,000 * * * so that a group of 10 such workers, with their

[7] See ibid., pp. 68–69 and 163–166, from which most of this discussion has been drawn.
[8] Ibid., p. 166.

ancilliary personnel and aids, would not appear to be beyond the resources of a moderately sized firm.[9]

Finally, let us note that although an ample supply of funds helps, it does not necessarily guarantee results. In fact, concentration of research attack in one large firm may actually hinder achievement. In the face of the tremendous uncertainty that actually surrounds most (major) inventive activity, it is usually important that as many avenues as possible be explored and that the individual researcher be given as free a hand as possible. High level programming and direction should be limited to statements of objectives; the choice of pathways and techniques for achieving the objectives should be left to the research personnel, and substantial competition and even duplication in research efforts should be encouraged and fostered. This type of approach to research and develpoment is one of the great lessons learned from U.S. experience with military research and development projects.[10]

However, it is an approach that typically runs counter to management ideas about efficient organization. Although there appear to be some important exceptions, the control of most industrial laboratories tends to be rather centralized, with early programing by the director of research in which each worker is assigned a prearranged task. Duplicative efforts often seem economically wasteful, especially to those controlling the purse strings. Modern notions about efficiency of business administration, buttressed by growing reliance upon cost accounting as a way of minimizing costs by weeding out inefficient operations—these are too deeply inbedded in the minds of most managements to permit the loose type of organization required for original and important inventions. Some large firms have tried it, at least for limited periods. But the odds seem against it.

The foregoing discussion should be sufficient to raise serious doubts that the great industrial laboratories are now the repositories of research and invention in the Western World that they have been made out to be and to caution against the glib tendency to identify large firms with serious research interests. This discussion should also prompt us to guard against glib assumptions that large teams of organized scientists and technicians working under close administrative guidance, with their tasks and goals carefully preestablished, are indeed the best approach to invention. It certainly remains to be demonstrated that there is a definite correlation between size of research organization and quality as well as quantity of inventive achievement. On the contrary, it is disquieting to hear of the number of research administrators who remark on the amount of piddling that goes on in the great laboratories and the heavy spending on marginal improvements designed to maintain patent controls. And students of invention have often commented on the number of truly important inventions that have been the work of individuals unassociated with an industry and thereby able to approach its problems with a completely fresh and detached outlook.

Outside sources of invention

Apart from the individual inventor's making his ideas known and available (for a price, of course) to business firms of all sizes, there are a number of sources of inventions outside the firm that make it possible for even the comparatively small firm to obtain the benefits of research and development. Take, for example, agriculture, that paragon of pure competition and the small firm. Except for isolated discoveries by wealthy farmers, in the past little technical advance has originated in this sector, but important advances, recently almost embarassing advances, have nonetheless been made. How? By whom? The answer is familiar to all: primarily, Government research agencies and experiment stations, and the agricultural schools of the land-grant colleges.

This fact is, of course, well-known. Yet it is surprising to find how many people refer to it in disparaging terms, as though there were something unclean about Government research performed for the farm sector. But such research is just as valuable as that performed in the private sector, and there is no reason

[9] Ibid., p. 160.

[10] See B. H. Klein and W. H. Meckling, "Applications of Operations Research to Development Decisions," Operations Research, May–June 1958; B. H. Klein, "A Radical Proposal for R. and D.," Fortune, May 1958; also see R. R. Nelson, "The Economics of Invention: A Survey of the Literature," the Journal of Business of the University of Chicago, April 1959; and C. J. Hitch, "Character of R. and D. in a Competitive Economy," Proceedings of a Conference on R. and D. and Its Impact on the Economy, National Science Foundation, Washington, 1958.

why it cannot be enlarged in the interests of making research and development compatible with more competition and smaller size firms. Of course, under the impact of defense goods, a greatly expanded program of Government research is already being carried on, and many recent tendencies in private industrial technology are traceable to pioneering Federal research and development projects. Among these tendencies are the application of radioisotopes, the drive toward competitively priced atomic power, cold sterilization of food by radiation, the formulation and fabrication of titanium and magnesium and other heat- and corrosion-resistant metals and alloys, etc. If such things can be accomplished by Government research for defense purposes, why can't they be done in peacetime as well? There is certainly one decisive advantage Government research and development has over private, and that is the avoidance of patent problems: the results are made available for all firms, large and small, to utilize as they wish and as promptly as they wish.

Moreover, it should be remembered that potentially large portion of the benefits of private research and development cannot be latched onto by private firms in the form of profits. This structure applies particularly to the results of basic or fundamental, as opposed to applied or practical, research, and probably plays a significant role in explaining the notable failure of private industry to engage in much basic research. Rightly so, I believe, patent law typically disallows the patentability of discoveries of fundamental ideas. At the same time, the absence of patent protection at the fundamental level must be acknowledged as a deterrent to the conduct of basic research by private firms. Furthermore, the fruits of basic research are likely to be rather long delayed and comparatively uncertain—uncertain as to outcome in general and uncertain as to the ability of the sponsoring firm to exploit a particular discovery, because of resource limitations of one sort or another. Under these circumstances, Government agencies, representing society or industry in general, possessing much lower time preference and risk discount rates and also lower capital costs, are potentially the ideal groups to conduct basic research, an area that by common consent has been badly neglected in this country.

This same line of thought suggests another potentially important drawback of the financial strength of the large firm in the field of research and invention. As a result of its ability to pay attractive salaries to scientists and technicians plus the factors mentioned in the preceding paragraph, the giant corporations succeeds not only in concentrating scarce resources in research featuring the short payoff, prototype production or design characteristics, but it deprives other sectors of the economy, like the university and Government sectors, of the resources to use in basic research. And of course, we might, if we wish, extend this point one important step further. We might also argue that the relatively high-paying, large corporations are drawing scientific personnel away from teaching, as well as research pursuits in our universities. In addition to being lost to basic research, therefore, they are being lost to a function certainly as vital, if not more so, to the extension of knowledge, namely, education. This loss must be considered in any evaluation of the research and development activities of the large firm.

Returning to the theme of sources of invention outside the business firm, let us note the appearance in recent years of another potentially important outside source. This is the independent profit-seeking research firm. Although large corporations make frequent use of such firms, their interest for us lies in their posing another solution they pose to the problem of expensive research and the small firm. In essence, the problem of the small firm consists of its inability to bear the potentially large overhead costs of its own research facilities and workers needed on some types of research. But the independent research firm, in making its services and facilities available to small firms, provides a wonderful way in which large numbers of the latter can, in effect, share these costs. The rapid proliferation of such firms holds great promise for future reconciliation of the problem of maintaining research, economic progress, and active competition. In an interesting way, these firms are another example of a free-enterprise system's remarkable capacity for providing people to undertake something when it is profitable to do so. And if research is as profitable as it is supposed to be, we may expect an increasing number of independent research firms to appear. Certainly, this is an institution whose growth warrants strong encouragement.

Paralleling the growth of such firms has been another institution especially designed to make available outside research and development facilities to the small firm. This is the industrial research association, a group which the

members of an industry jointly finance and from which all can take new technical discoveries on equal terms; and in many cases, there is no question of agreements to fix prices. Provided price fixing can be uniformly avoided, the industrial research association is another way in which small firms can and do share the overhead costs of research.

Add to these the many nonprofit research institutions and foundations, the laboratories of the universities, and the individual inventor, whom we have found to be still a decidedly prominent source of inventions, and it will be seen that there are many outside sources of research facilities available to the small firm. When we consider the matter in this light, research, economic progress and active competition, characterized by small and medium size firms, do not appear as incompatible as they are often made out to be.

MONOPOLY AND ECONOMIC PROGRESS

As remarked at the beginning of this paper, there are many who claim not only that the giant firm is needed to undertake research in the modern era, but that the substantial degree of monopoly power that large size usually confers is equally vital to economic progress. Far from being exorcised by the existence of significant monopoly power, these people see in it a definite advantage aiding our quest for technical progress and higher living standards. This advantage is felt to outweigh by a considerable margin the losses from oft-admitted monopolistic powers. So, without further ado, let us see of what fabric this argument is made.

The capacities for and stimuli to progress engendered by monopoly power

The arguments favoring monopoly power as a source of progress fall into two categories. One is that the capacities of the enterprisers with significant monopoly power are more likely to lead in the direction of progress than those enmeshed in the environs of pure competition. The other argument views a strong element of monopoly power as an absolute stimulus to progress.

Capacities for innovation.—Dynamic and imaginative entrepreneurs are not likely to be found in pure competition, for the very nature of this market structure tends to be too inhibitive, limiting as it does the activities of the firm to pure production decisions. There is no room for aggressive price and sales policies, no leeway for "creative" product variation, and no outlet for original and striking advertising campaigns. These are indeed cold and uninviting surroundings for the energetic and fertile businessman, galvanized for action and impatient to try out new ideas.

Moreover, because the monopolistic firm is apt to be large in size, it will be in a good position to afford to employ executives with the traits just described, men with the capacities to originate and develop new ideas and ways of doing things. In addition, monopolistic power is frequently the result of superior entrepreneurial ability, ability that can be counted upon to continue the drive for new methods and new products in an effort to enhance monopoly power, perhaps, but still redounding to the benefit of society.

Furthermore, and probably more important, monopoly profits are a principal source of funds to finance research and to finance new equipment implementing discoveries. Expenditures for research are a very risky type of investment, and the protection that monopoly power affords acts as an inducement to spend on research, because the firm feels a measure of security from the knowledge that it will likely be the sole possessor of the new inventions its produces. Ample proof of this is found in the demonstrably heavy concern with research in concentrated industries and, within these, in the largest and more monopolistic concerns. (This last is a highly questionable statement, as the discussion on pp. 8–10 above showed.)

Incentives to innovate.—Probably the most important aspect of the monopoly-cum-progress argument is associated with the matter of incentives. Monopoly power is said to be an indispensable adjunct to the willingness of the firm to invest in the production and sale of new and untried products and techniques of production. Investment of this type, i.e., innovational investment, is often very risky and expensive. It runs the risk of buyer resistance, of long and expensive sales campaigns to overcome this resistance, and possibly of ultimate failure. Expensive investments in new plant and equipment may be required, often preceded by equally expensive periods of experimentation and development. As a result, the excess profits associated with substantial monopoly power are a necessary inducement to innovation. Without the protective shield

of such monopoly power, or contrariwise, with the prospect of easy and quick imitation and vigorous competition, the incentive to undertake these expensive risky innovations would evaporate. Vigorous competition in the innovative process would cause this process to wither on the vine. Monopoly power in this connection is the very life-giving air on which economic progress thrives.

Monopoly power as a source of restraint on economic progress

As usual, there are at least two sides to every question, and this is no less true on the issue of the role of monopoly power in the innovation process. For one think, it would be an egregious mistake to identify the growth of monopolistic power with superior entrepreneurial ability. In some cases, such as the Ford Motor Co., there doubtless has been a large element of this superiority behind the accrual of such power to giant firms. But looking back over the past, particularly to the great merger movements in the period around 1900 and in the 1920's, we find that the greatest source of impetus to these movements originated in the desire to curb competition and from the great profits for the promoters of these mergers. Today, such things as tax considerations, desires to assure sources of supply or market outlets, or product diversification seem to be fostering mergers, rather than any unusual entrepreneurial talents—at least of the type that necessarily bodes well for technical progress.

Moreover, quite the opposite from being a convenient vehicle for the exercise of the talents of the dynamic and imaginative entrepreneur, the large corporation can lead, and has led, to developments not conducive to the risk-taking that is associated with innovation. Chief among these is the emergence of bureaucratic organizations of officials to carry out the multiple, complex functions inherent in modern large-scale enterprise. The bureaucrats of the large corporations, usually cloaked with substantial monopoly power, develop a strong sense of security about their jobs, a "career" attitude toward managerial positions, that make it imperative to be a good "organization or team man," to follow the accepted rules of action and behavior.[11] These are not the qualities of the prospective innovator. Risky ventures are avoided that might destabilize existing market situations and threaten the position of the entrenched managerial bureaucracies, which operate better in a stable, rather than a changing, environment; these bureaucracies tend to become instruments of resistance to, not promoters of, change.

Moreover, it must be remembered that innovations that are substitutes for existing products and processes involve losses from the scrapping of existing plant and equipment. Firms protected by monopoly power may be expected to try to avoid such losses by postponing innovation until the existing capital goods have considerably depreciated. Why render obsolete with a new innovation what may have been painfully built up in the past? And this is no less true of firms that spend large sums on research than of those who do not. In fact, for the former, much of their research may be aimed at the protection of existing monopolistic strength, as well as the avoidance of capital loss through obsolescence—by obtaining patents ahead of others threatening the firm's entrenched position. Scrutiny of the innovational behavior of the electric lamp, radio and television, railway locomotive, and telephone industries, among others, discloses that innovations of competitive products have occurred only after long periods of market exploitation of old products. The investigations of a number of writers have brought them to the conclusion that new firms are very often needed if radically new innovations are to take place; this has even been true in industries where the established firms have had reputations for progressiveness, such as the electric lamp and telephone industries.[12] A study of new firms established in Connecticut after World War II reveals that a large percentage were set up in order to innovate a new product invented by one of the owners. Frequently, the inventor felt constrained to leave his previous job for this purpose because he could not interest his superiors in his invention.[13]

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[11] For interesting and incisive discussions of the extent to which these qualities of corporation executives are now being emphasized, see Vance Packard, "The Hidden Persuaders" (Philadelphia, D 1957), ch. 18; and W. H. Whyte, "The Organization Man" (New York, 1956).

[12] See W. R. MacLaurin, "Invention and Innovation in the Radio Industry" (New York, 1949); A. A. Bright, "The Electric Lamp Industry: Technological Change and Economic Development," 1800–1947 (New York, 1949); and R. Schlaifer and S. D. Heron, "The Development of Aircraft Engines and Fuels" (Cambridge, Mass., 1950). See also, Nelson, op. cit., pp. 108–109.

[13] See G. Brown, "Characteristics of New Enterprises," New England Business Review, June and July 1957. Cited in Nelson, loc. cit.

This information should not be unexpected. Innovation is certainly expensive and risky. The intelligent entrepreneur is all too aware of this, particularly if he has recently experienced the trials and tribulations of innovation and market consolidation. Following this experience, a period of quiescence is apt to be the most attractive situation. With good profits, monopoly powers that may insulate well against potential competition, executives are more prone to refrain from innovation, to be content with protecting the fruits of past efforts. They are hardly likely to want to render obsolete soon afterwards with a new innovation what may have been painfully built up in the past.

Competition as a source of innovational incentives

These problems do not arise when there is active and intense competition, although not necessarily pure competition. The adoption of new techniques or products by some firms under competitive conditions literally forces the rest to follow suit, to abandon its existing equipment and write off the losses, or else run the risk of being undersold or losing customers to the new products being introduced by the competitors. In addition, a firm without significant monopoly power, whose share of the market is small, will find the adoption of the latest techniques and products especially attractive as a means of underselling competitive firms and invading their markets. For the losses from scrapping existing equipment will seem rather minor compared to the profits to be garnered from the enlargement of its markets. It is the monopolistic firm, with a sizable portion of the market, that finds losses on sunk capital large compared with prospective profits from further broadening of its market share.

Likewise, competition in contrast with strong monopoly situations, is ordinarily associated with freedom of entry, with the full freedom for new firms to enter an industry with new and cheaper techniques or new, substitute products. The new firm, too, is likely to be a more aggressive innovator. By definition, it has no vested interest in maintaining the capital values of existing plant and equipment, no vested interest in maintaining existing markets. It will want to take advantage of the latest techniques and equipment, and in doing so will force the existing firms to fall in line or be outsold.

Monopoly, on the other hand, obstructs the entry of new firms. Sometimes, it does this by deliberate action, as by threatening destructive price competition, patent shelving and expensive and drawn-out patent litigation, controls oversupplies of important materials, etc. At other times, the mere strength of the monopolistic firm's hold on the market may act as a strong deterrent to the entry of new firms.

Perhaps the outstanding feature of active, intense competition in connection with the innovating process is the persistent pressure it exerts to search for and adopt innovations that would otherwise be delayed if introduced at all. It is sometimes said that strong monopoly power is not necessarily inconsistent with innovation. Despite what was said above, there are large firms that can and do have vigorous managements vitally interested in research and development, of sanguine outlook and adventurous spirits, and constantly willing to exploit new ideas in the marketplace. This is true; there are indeed firms with such managements. But we have also seen that there are many firms, with much monopolistic power, whose managements have not been of this ilk.

The advantage of active, intense competition lies in the fact that it does not leave innovative ability and behavior to pure chance. The persistent pressures from competition provide a compelling force to innovate or fall behind and perhaps eventually disappear altogether. Competition is also the proper stimulant to prevent firms from seeking "the quiet life," from being content to reap the fruits of past efforts and rest on their laurels. If it is true that modern managements of large corporations are not profit mad, grasping ogres, anxious to maximize earnings, it follows that the drive for profits is no longer the reliable spur to innovations it was once thought to be. Competition again, however, does not rely on the chance existence of a strong drive for profits. It provides an inspiration to innovate all its own.

In reply, it is often argued that even firms with apparently substantial degrees of monopoly power are not immune to strong competitive pressures. There have been dramatic struggles even in monopolistic (or oligopolistic) markets; new firms have overcome obstacles in the past and encroached seriously upon monopolistic markets; interindustry competition among otherwise monopolistic firms producing substitute goods has often waxed hot, and so on. In brief, competition is an ubiquitious and pervasive force from which no firm can ever completely cut itself off and enjoy peace and tranquility.

There may be a strong element of truth in this view, although there certainly have been protracted periods during which many large firms have been able to enjoy peace and quiet. Irrespective of the truth of these remarks, however, they can hardly be regarded as a defense of monopoly power. They merely show that despite its existence elements of competition make their presence felt. This sounds like a very good case for enlarging the area in which competition is allowed to operate, that is, for weakening the forces of monopoly.

Temporary versus entrenched monopoly power

We have yet to deal with the argument that monopoly power is a necessary incentive to innovation. This argument, remember, rests on the premise that the prospect of excess profits stemming from monopoly power are needed to induce potential innovators to undertake the great risk and expense that is often associated with innovation. If potential imitation is quick and easy, there is little inducement to accept the possibility of losses. There is undoubtedly considerable merit in this reasoning, and of course, upon it rests the basis for the patent system, which is certainly one of the outstanding but widely accepted, forms of monopoly. Paradoxically, from the point of view of maintaining competition, there is an even more persuasive case in favor of the patent system. It is the one source of potential reward for the independent inventor or new and/or small firm attempting to market a new process or product. Certainly, any efforts to raise outside funds with which to exploit inventions would be well-nigh hopeless without the patent.

However, even if we grant the validity of this form of monopoly power, this is something quite different from granting the general validity of all forms of monopoly power, even for economic progress. In examining the role of monopoly power in economic progress, we must be careful to make a proper distinction between those temporary monopolies that are needed to induce investment and the more general and established monopolies that threaten to, and often do, stifle progress, for we have found nothing in established monopolistic power that necessarily constitutes a source of incentive to innovate; on the contrary, we have found much that may smother progress. If established monopolies remain progressive, this characteristic may probably be traced to the persistence of competitive pressures, or possibly to chance attributes that make management interested in invention and innovation.

Even in the case of the supposedly temporary monopolies granted by patents, there are many instances of strong innovative activity without them, or with patents of dubious value, because the original inventions were subject to sufficiently close imitation as to negate their exclusive value. This knowledge should make us wonder whether the value of the patent system, and its temporary monopoly power, hasn't been exaggerated. Questions of this sort have even been raised in connection with that almost uniquely expensive innovation, nylon, on which some $6 million were reportedly spent. It is asked whether in the face of the obviously enormous market decreed by fashion, a number of firms wouldn't have been willing to risk this innovation under competitive conditions. And in the face of the numerous competitive synthetic fibers that were already in prospect at the time nylon was marketed, it may be asked just how much of an incentive the patent on nylon offered. In view of the ease with which so many inventions may eventually be imitated, it may rightfully be asked whether the gains from patents are really in the nature of monopoly profits or whether they merely reflect the profits that accrue to the innovator simply because he is ahead of others and that a time lag is involved before the rest can catch up. Some large corporations implicitly recognize the legitimacy of this question by making most of their patents available to everyone in the knowledge that patents have a very restricted utility, because imitation is so easy. However, this is no place to go into an extended discussion of the patent system.

Whatever the merits of temporary forms of monopoly power like those granted by patents, one thing seems certain. There are so many instances of innovations by firms possessing little or no monopoly power that we can feel free to cast to the winds most of the suggestions that established monopolies are a necessary, or even an important, ingredient of economic progress. The one feature of large business size and monopoly power that appears to carry considerable weight is associated with the usually large (absolute) profits of the big monopolistic firm as a source of funds to finance research and innovation. This, however, is simply one aspect of the well-known differential access to finance of the

small and large firms. To recognize this finance problem, however, is not necessarily to condone giant size and monopoly power as the solution. Financial aid to small business of the sort envisioned in the establishment of the Small Business Administration and the recent expansion in its activities offers a more hopeful and worthy solution. But such programs must be carried out on a much larger scale if they are to succeed in their goals of maintaining and enlarging the scope of competition in our economy.

APPENDIX I(C)

United States, 1953 expenditure on research and development per company for all companies conducting research and development—by size groups of companies and industries[1]

[In millions of dollars]

Industries	Expenditure on research and development per company for companies—	
	With employment over 5,000	With employment 500–999
Food and kindred products	1.0	0.02
Chemical and allied products	8.6	.44
Petroleum products and extraction	6.1	.12
Rubber products	5.2	.09
Primary metal	1.5	.02
Fabricated metal	1.7	.15
Machinery	3.6	.16
Electrical equipment	28.7	.42
Aircraft and parts	35.8	1.95
Professional and scientific instruments	11.4	.70
Other manufacturing	5.9	.03

[1] Based on National Science Foundation, "Science and Engineering in American Industry," tables A–3 and A–9, cited; Jewkes, Sawers, and Stillerman, "The Sources of Invention."

United States, 1951—Ranking (1–14) of major industrial groups as to research and development expenditure and size of firms

Industry	Ranking of 14 industrial groups according to—		
	Expenditure on research and development (non-Government-financed) as percent of sales (1)	Average size of firm, number of employees (2)	Percent of total employment in upper 1 percent of firms (3)
Electrical machinery	1	5	7
Professional and scientific instruments	2	9	4
Chemical and allied products	3	8	2
Stone, clay, and glass products	4	12	9
Transportation equipment	5	1	1
Machinery (except electrical)	6	10	8
Textile mill products	7	6	13
Rubber products	8	3	5
Petroleum refinery	9	2	3
Fabricated metal products	10	11	11
Other manufacturing	11	14	12
Paper and allied products	12	7	14
Primary metal industries	13	4	6
Food and kindred products	14	13	10

Col. (1) based on tables in "Scientific Research and Development in American Industry, 1953," Bull. 1148, U.S. Department of Labor.

Cols. (2) and (3) based on size characteristics of the business population, "Survey of Current Business, May 1954" cited; Jewkes, Sawers, and Stillerman, "The Sources of Invention, 1958."

Chemical and allied products—United States, 1951,[1] percentage of cost of research and development to value of sales

Size group of company	Average percentage	Median percentage	Lower quartile percentage	Upper quartile percentage
Less than 500 employees (162 companies)	2.5	2.6	1.3	5.8
500–4,999 employees (58 companies)	2.4	1.7	1.0	2.7
More than 5,000 employees (22 companies)	2.6	2.4	1.7	3.9

[1] "Scientific Research and Development in American Industry, 1951," U.S. Department of Labor, table C-20 cited; Jewkes, Sawers, and Stillerman, "The Sources of Invention, 1958."

15 largest oil companies in the United States, 1948

Size group total assets (millions of dollars)	Average size of research staff	Smallest research staff	Largest research staff
Over 1,500	811	455	1,123
1,000 to 1,500	944	469	1,129
500 to 1,000	691	378	1,314
230 to 500	184	95	347

Cited as above, "The Sources of Invention, 1958."

APPENDIX II

PREPARED STATEMENT OF B. G. WEIL, PATENT COUNSEL, THE MARTIN CO., BALTIMORE, MD.

DECEMBER 4, 1959.

Hon. RUSSELL B. LONG,
Chairman, Subcommittee on Monopoly,
Select Comimttee on Small Business, U.S. Senate, Washington, D.C.

DEAR SENATOR LONG: This letter is written in reply to your letter of November 19, 1959, inviting the Martin Co. to submit a written statement of its experience under present Federal policies with respect to patents and technical knowledge resulting from Government-financed contracts. We regret that we were unable to have this statement to you by December 1 for reasons explained to Mr. Gordon. your staff economist. We also wish to acknowledge advice from Mr. Gordon to the effect that this statement will suffice the needs of the committee and that no witness from the Martin Co. is required at your hearings.

Martin is presently, and has been for some years past, almost wholly engaged in the production of items for sale to the U.S. Government either directly as a prime contractor or indirectly as a subcontractor. Its sales to the Government, under Government contracts, amount to more than 99 percent of Martin's sales. Commercial sales predominantly result from spare parts for commercial aircraft which it produced and sold in and prior to 1953. Consequently, the sale of its products in the commercial market is not a matter of controlling importance or financial significance in the recent operations of the Martin Co.

This intense concentration by Martin on the Government market came about from a change of management at Martin, occurring about the beginning of 1952. Our new management felt that Martin should withdraw from the commercial field and specialize in the field of national defense products such as guided missiles, electronic systems, military aircraft, and special nuclear systems for defense applications.

Furthermore, Martin has undergone other radical changes in its business besides withdrawal from the commercial field since 1952. The trend away from the aircraft business has gone even further in the interim period. Today, Martin is to all practical purposes out of the aircraft business. It does not expect to design and produce another aircraft. Our transition to the space, nuclear, missile, and electronics field is nearly complete.

Your subcommittee has requested a statement of our experience under present Federal policies with respect to patents and technical knowledge resulting from Government contracts and patents applied for or secured thereunder. Because of the previously outlined changes in Martin's business, I feel sure you will agree with me that the period from 1952 to date is the significant period, and that events transpiring prior to 1952 are of historical interest only. Consequently, my statement will be limited to matters occurring from the period 1952 to date as representative of the experience of the Martin Co. as it exists today.

During the period 1952 to November 20, 1959, Martin has filed 104 U.S. patent applications resulting from Government contracts. Of this number 46 patent applications have matured into issued patents and 58 patent applications are still pending.

All the foregoing patents and patent applications are subject to a royalty-free license to the U.S. Government to practice or cause to be practiced by or for the United States the inventions covered by these patents and patent applications. Also, these Government licensed patents and patent applications include, not only patentable inventions directly made in the course of performance of our contracts, but those made in the course of the performance of general research programs financed in whole or in part by the Government through reimbursed overhead.

Patents are normally obtained for three purposes. First, they are filed for offensive purposes to exclude your competitors from making, using, or selling a product covered by your own patent. Second, they are filed for defensive purposes to protect the patent owner's right to market a product covered by a patent, and insure freedom from charges of infringement by third parties. Thirdly, they are filed with the objective of obtaining royalty income through licensing inventions to others for a consideration. As will be hereinafter pointed out in detail, these conventional economic benefits normally derived from patents in their ordinary aspect are not present in the case of the Martin Co.

First, with respect to offensive patenting, our patents are available for use by all Government contractors on a royalty-free basis through the Government license. Since Martin is wholly concerned with Government contract work for all practical purpose, all these patents derived from Government contracts are available to our competition, big or small, without charge. There is no carry-over of patent rights resulting from Government-financed work into commercial work with resultant advantages to Martin's commercial product line because Martin is not doing business in the commercial field. Thus, the advantages of offensive patenting do not accrue to Martin.

Secondly, under Government contracts made with agencies that do not require transfer of title to the Government, a contractor has the option to report an invention to the Government and indicate that the contractor does not desire to file a patent application. In such cases, title to the invention passes to the Government, who then has the right to patent the invention, subject to a royalty-free license to the contractor. The foregoing procedure suffices to satisfy the normal requirement for defensive patenting.

Lastly, there remains the matter of royalty income derived through licensing inventions to third parties. Naturally Martin receives no royalty income from the use of contract inventions by Government contractors. This leaves royalty income only derived from licensing of commercial rights to be considered. While our inventions quite logically relate to our defense products and are primarily adapted for use therein, the prospect of their commercial usage is present and royalty income from such usages should not be summarily dismissed as an improbable contingency. Such royalties are shared by the company and the inventor under our patent incentive plan, and the possibility of the individual inventor receiving his share of such royalties is an important incentive to the making of inventions. However, for the period under study royalty income derived from inventions to which the Government has contributed financially has been credited to Government contracts until the Government's contribution has been recouped. It is only after the Government's financial contribution is retired that Martin can retain any royalty income for its own account. This procedure serves to make the Government whole financially. It also provides an incentive to our inventors to invent by allowing some royalty income, at least, to be made available to them through our royalty-sharing plan. However, it should be realized that in many cases the Government's contribution is sub-

stantial and since it must be refunded before any benefits accrue to Martin, the normal royalty income potentialities available to patent owners generally are severely limited in the case of Martin's contract patents. Lastly, recent changes in procurement regulations indicate that the sharing royalty arrangement referred to above may no longer be permitted in the future and that all royalty income derived from patents derived from Government contract financing may be credited to the Government. If such proves to be the case, even the limited royalty benefits allowable to Martin at present will no longer exist.

While we are on the subject of patent licenses, I would like to state that all of these Martin patents derived during the period under consideration are available for licensing in the commercial field to business generally upon reasonable terms and upon conventional conditions. We do not pursue an active program of seeking out licenses as there is little economic incentive to do so in most cases because of the treatment of our royalty income previously explained. However, Martin's management has never refused to license any business, large or small, which has requested a license under these patents.

You may logically wonder why Martin applies for and obtains patents under the conditions outlined above. The answer, although unconventional, is simple. In the type of business we are in, creative engineering is of paramount importance. The highest type of creative engineering is inventive engineering. The obtaining of patents is an official recognition of such creative inventive work product of an engineer and, for that reason, patents are highly regarded by the individual engineers who consider them to be primary evidence of their scientific achievements. Also, the obtaining of a patent not only is desired by engineers from a scientific status point of view, but they are sought after as concrete evidence that an engineer is performing his duties in a manner which would merit employment benefits such as salary increases, promotions or both. We, therefore, primarily apply for patents to provide an attractive incentive for engineers to demonstrate their creative ability and to provide tangible recognition thereof. We also obtain patents to demonstrate the company's capacity for creative engineering, exercise of inventive ingenuity, and ability to advance the state of the art. Lastly, we apply for patents in order to provide a further incentive to our inventors through the payment of a share of royalties derived therefrom under our patent incentive plan. We do not obtain patents for the purpose of monopolizing areas of technology and to obtain a corner on a defined product line.

Martin is a prime contractor for the Air Force, Army, Navy, Atomic Energy Commission, and NASA under research and development contracts. These procurement agencies have widely divergent practices with respect to patents and proprietary data. So far, we have been able to live with them all. However, we have certain recommendations to make with regard to improvement of this situation which will be discussed at the end of this statement.

We, of course, by our prime contracts are obligated to pass on to our subcontractors certain contractual obligations with respect to patents, proprietary data, and reproduction rights. We have experienced only very isolated difficulties in obtaining our subcontractors' consent to incorporating such clauses in our subcontracts and we have had no case of any subcontractor refusing to accept these clauses.

We make every reasonable effort to protect our subcontractors' proprietary rights. We scrupulously avoid "pirating" and "bleeding" of our vendors' engineering know-how and design ingenuity. Our reasons for doing this are simple. Our business is selling creative engineering and its embodiment in our defense. To plagiarize the creative efforts of others would be practicing intellectual dishonesty. No company, whose business is creative engineering, tainted with the stigma of such practices could hope to remain in business very long. We also make every effort to avoid dilution of our potential subcontractors' proprietary rights by allowing their proprietary information to get into the possession of their competitors. The following extract from our procurement manual used by all our buyers reflects our company policy and procedures to insure that this be accomplished:

"1. Treat any property right or intangible right of others with the same regard as the company expects others to treat its property right.

"2. Do not make prints or drawings of one vendor available to another vendor as a "favor" (because they will expect the same treatment of their property and the buyer will lose the vendor's respect for the company).

"3. Do not make prints and drawings of one vendor available to another for the purpose of securing bids for any company purpose, or for the purposes of

establishing a second source. Where proprietary rights are concerned, the problem of second sources should be discussed with the contracting officer (through the procurement contracts administrator) and the question of second sources will be worked out by the Government.

"4. Do not 'hint at' or disclose the fact that any vendor is working on any new product or along a new design, if there is any reason to believe that the first vendor's right may be injured. Resolve doubt in favor of refusing any confidential disclosure of drawings and data. However, if they are necessary in company business, then they should be marked and so treated within the company. It is common practice for one vendor to try to find out through buyers what the competition is doing. Buyers will gain the respect of vendors if such information cannot be obtained from them. A buyer will be in a much better position if he will listen to what potential vendors propose. It is not good technique to try for a better bargain by talking even in general terms about what the competition may or will do. The buyer may inadvertently guess very closely, and at some subsequent time be accused of having divulged information obtained from other vendors.

"5. If it is established that a vendor is the owner or licensee of patent rights in inventions required in equipment, then every effort should be made to buy from him. You will probably get better value because of the background or know-how that the vendor will have. The price may not be the lowest because the patent owner or licensee will want to retire some of his capital investment in the research and/or development, but such vendor will be more reliable source, and the company's requirement will be fulfilled without interference with deliveries by patent owners."

In conclusion, we would like to make a recommendation in view of our experience under Government research and development contracts. As previously stated, contract requirements concerning proprietary rights, patent rights, and reproduction rights vary markedly between the various procurement agencies. We realize there are divergent views in such held by the various procurement agencies with which we do business and that in the cases of the AEC and NASA, they are bound by statutory enactments.

We also do not care to become involved in any intragovernmental disagreements as to these matters. However, we do wish to recommend a policy of uniformity in such matters. The present situation favors inventors who work under contracts whereby the contractor keeps title over inventors working under contracts with agencies that require title to be conveyed to the Government. This is depressing to morale and stifles the urge to invent by making some inventors a second class of inventors not having the benefits of our patent system. We would prefer to see the policies of the Department of Defense uniformly adopted throughout the Government. We believe that these policies that permit the contractor to retain title to inventions made under contracts are best both for the inventor and for the contractor. This system provides the strongest incentive to invent by providing recognition by and within the company for whom an inventor works through the obtaining of company-held patents. We are always impressed by the creative "flash or genius" evidenced by patentable inventions made by our employees, and we feel it is our duty to give our employees internal company recognition for their important contributions to the company, and to the Government by ourselves obtaining patents evidencing their inventive creations. Such personal attention produces an atmosphere of creativity which we believe will insure the success of research and development work undertaken for the Government.

We are pleased to have had this opportunity to submit our statement on these subjects and hope they will be of assistance to your subcommittee.

Very truly yours,

THE MARTIN CO.,
B. G. WEIL,
Patent Counsel.

APPENDIX III

PREPARED STATEMENT OF W. BIGELOW HALL, PRESIDENT, THE BOSTON PATENT LAW ASSOCIATION, BOSTON, MASS.

The Boston Patent Law Association has been informed by the National Council of Patent Law Associations that the Senate Select Committee on Small Business is planning to hold public hearings on December 8 and 9 of this year to find out

if Government patent policies are hurting smaller companies. While this association would have preferred to have a representative appear in person before the committee to present its views, we understand that all the time has already been allocated to witnesses. In lieu of an actual appearance before the committee, the association presents this statement.

At the present time the contracting agencies of the Government are following conflicting policies with respect to inventions developed under research and development contracts. The Department of Defense requires as a minimum only a royalty-free nonexclusive license; commercial patent rights are left with the contractor if he wants them. This policy has been in operation for over 10 years. No enabling legislation for this policy is provided by the Armed Services Procurement Act of 1948. The National Aeronautics and Space Act, on the other hand, specifies that title to all inventions made under similar circumstances shall be in the Government; except that the Space Administration may permit the contractor to retain certain rights under certain specified conditions.

It is the experience of the members of this association that the policy of the Department of Defense is definitely helpful to the many small research based industries in this area in competing commercially with larger firms. It is also our experience and opinion that the policy enunciated by the Space Act will be extremely detrimental to the competitive position of the small businesses in our area. Because of this conviction, this association has gone on record that the provisions of the Space Act requiring this policy should be changed to permit the National Aeronautics and Space Administration to adopt policies similar to those of the Department of Defense. A representative of this association is to appear at the hearings scheduled to begin on December 3 on this subject before the House Committee on Science and Astronautics to urge the association's position.

The Boston Patent Law Association is in a unique position to provide this committee with information with regard to the operation of Government patent policies. It is an association of approximately 190 members, these members representing the many small technically oriented companies which have grown up in this region since World War II. Many of these companies were originally based on research and development effort carried on with Government funds. The effect on these companies of retention or nonretention of commercial rights to patentable invention made in the course of this research and development work is clearly apparent to the members of our association.

If the contractor can retain commercial patent rights to an invention, he is encouraged to develop and market it for commercial use. Without the umbrella of patent protection, further development of a product initially developed for the Government may not be undertaken because of the risk that once the developer has successfully marketed it, large companies with highly efficient production capabilities can copy the product and drive the developer out of the market by price competition. Thus, the small reasearch-based companies for which New England is famous are aided in their competitive efforts by the Department of Defense policy. They are encouraged to risk their own funds to make the benefits of Government research available to the public at large. The policy of the Space Act definitely discourages this activity. When the Government takes title to an invention the patent rights are effectively dedicated to the public. Without patent protection, there is little desire on the part of small companies to engage in a commercial development and marketing program.

It has been suggested that the Department of Defense policy should be changed, since a large portion of Department of Defense research contracting is concentrated in a small number of large companies.[1] It is reasoned that the commercial patent rights accruing from this research will also be concentrated in the large companies doing the research and that this concentration of economic power is undesirable because it eliminates free competition.

The fallacy in this argument is that large companies do not generally depend upon a patent position for market leadership. Thoughtful commentators on the patent system have long recognized this. For example in Kottke, "Electrical Invention and the Public Interest," 1944, the author states at page 59:

"In general, the leading concerns have more to gain and less to lose by a repeal of the patent law than have smaller competitors. On the one hand, they are exceedingly vulnerable to suits for infringement, and for purely defensive purposes they must go to considerable expense to patent every aspect of each

[1] Attorney General's report of Nov. 9, 1956, pursuant to sec. 708(e) of the Defense Production Act of 1950.

innovation. On the other hand, they are far less dependent on patents for a sheltered market in which to recoup research and engineering expenses and such capital losses as may result from changes of technique."

We also have at hand an example of an entire industry—electronics—in which a substantial portion of all the research and development effort in recent years has been sponsored by the Government—and more particularly by the Department of Defense. Has the Department of Defense policy under which the tremendous expansion of this industry has taken place "* * * rewarded the giants of American industry at the expense of their smaller competitors?" The members of this association represent many of the smaller competitors. Our experience is that it has not. We find the Fortune magazine agrees with us.

In its April 1957 issue, Fortune published the first of four articles dealing with a survey of the electronics industry. In this article it stated: "* * * there is nothing unduly concentrated about an industry in which 95 percent of the total business is shared among 108 companies, and in which 19 of these companies each do more than $100 million worth electronic business. * * * there is almost limitless opportunity for scientist-engineers with entrepreneurial instincts to set up small businesses to exploit their inventions." At another point the survey states:

"A common hazard in electronics is that even when a market has shaken down * * * new technology comes along and again upsets it. * * * The compensating factor, so far as the general state of competition is concerned, is that the new technology can be the avenue by which new firms enter electronics."

Thus, it is apparent that in the one industry in which Government sponsored research has played its greatest role, the Department of Defense policy has resulted in substantial assistance to new small companies entering the field. Our association seriously questions whether Fortune could have made the quoted statements had the Department of Defense patent policy been that specified in section 305 of the Space Act.

SUMMARY

The Boston Patent Law Association finds on the basis of the experience of its members that a Government patent policy of the Department of Defense type is definitely of major assistance to small businesses, and does not reward the larger corporations at the expense of the smaller. On the other hand it is anticipated that the Space Act policy, unless changed, will have serious consequencies to many of the smaller businesses in our area.

Respectfully submitted.

BOSTON PATENT LAW ASSOCIATION,
By U. BIGELOW HALL,
President.

APPENDIX IV

PREPARED STATEMENT OF A. KELLY, EXECUTIVE VICE PRESIDENT, THE B. F. GOODRICH CO., AKRON, OHIO

DECEMBER 4, 1959.

Re Patent rights under research contracts.

Senator RUSSELL B. LONG,
Chairman, Senate Small Business Monopoly Subcommittee,
Washington, D.C.

MY DEAR SENATOR LONG: We understand from the newspapers that you have invited some people to inform your committee of possible disadvantages of the present procedures for placing Government research contracts. No doubt you are obtaining the views of the Department of Defense and other agencies which place such contracts, as well as the views of other congressional committees dealing with placement of such contracts. In addition, consideration should of course be given to the experiences of business concerns which actually operate under Government research contracts, and it is from this viewpoint that we are writing to you.

There are several aspects of this general subject that need to be considered. First, efficient and effective use of Government funds. Second, incentives for acceptance of research contracts and for accomplishment of the desired results. Third, fair allocation of patent rights. Fourth, availability of technical information.

Efficient use of funds obviously requires that research be conducted by those who can produce results, do it quickly, and at reasonable cost. There are many research projects which can be performed by small businesses or even by individuals, if they can learn what is desired and can convince the procurement officers of their responsibility and competence. If your committee can assist in this, without increasing the cost to the Government, it will be an important advance.

Incentives must exist, else qualified concerns will not accept research contracts at all. Manufacturers must rely on manufacture of products in large volume for the major part of their profits. Unless a manufacturer can be sure of having the unlimited right to manufacture a patentable invention arising from his own research, he will be very reluctant to undertake the research at all, and will not have the incentive to do the best possible work.

Patent rights arising from research contracts can be dealt with in several ways. One is to have the sponsor who pays for the research own the results including the patents. This is normal for research conducted by engineering firms (and is required by the very controversial sec. 305 of the new Space Act) but is not satisfactory for a manufacturer, as was explained in the preceding paragraph, for the more inventions the manufacturer makes, the more things he would be unable to manufacture. Another way will be for the sponsor to own the patents and for the research contractor to have operating rights—a free license. Or the sponsor may take a free license and allow the research contractor to keep the remaining rights (which is the practice of the Department of Defense under sec. 9 of Armed Services Procuremnt Regulations). The latter procedure was adopted after extensive trials of other procedures because experience showed that it permittted the Government to achieve its research objectives most rapidly and efficiently. It does not discriminate against other concerns in placement of Government manufacturing contracts, since the Government has the right to buy and normally does buy from the cheapest source. It gives the research contractor a substantial advantage only as to manufacture of Commercial (nonmilitary) products, to which most Government research contracts are not directed. In fields other than the military, the National Science Foundation act (42 U.S.C. 1871) requires that the research contract contain provisions to protect the public interest and the equities of the contractor, and the practice of the Foundation under this provision seems to be generally sound.

Technical information or know-how arising from research contracts is normally required to be submitted in the form of complete reports including working drawings and instructions from manufacture, and will be in the hands of procurement officers for delivery to other suppliers who might wish to make a particular product for the Government. In addition, in contracts for work on extensive projects, it is frequently required that each research contractor deliver copies of all reports not only to the Government agencies but also to all other contractors involved in any part of the project, so that the information resulting from the research is actually disseminated very quickly and extensively. Moreover, complete descriptions of all patented inventions are published when the patents are granted. An important limitation on distribution of information is secrecy of many military projects, and your committee may be able to assist in simplification of the duplication and excessive complexity which exists in the laws and rules administered by various different organizations such as the Department of Defense (sometmes several different branches at once), the Patent Office, and the Department of State in dealing with information on the same subject.

The major problems in this field seem to be administrative rather than legislative. The principal exception seems to be the hastily adopted section 305 of the Space Act, which is a serious deterrent to conduct of research for the Space Administration by either small business or large business, because it deprives the contractor of assurance that he can use his own inventions and establishes what could be a complete Government monopoly not only as to space travel but also as to ordinary airplane transportation. A revision of this section is being studied by the House of Representatives Committee on Science and Astronautics at this very time and should also be considered by the Senate.

Sincerely yours,

A. KELLY.

APPENDIX V

PREPARED STATEMENT OF HENRY H. WEBB, PRESIDENT, AMERICAN PATENT LAW ASSOCIATION, WASHINGTON, D.C.

DECEMBER 14, 1959.

HON. RUSSELL B. LONG,
Chairman, Senate Small Business-Monopoly Subcommittee,
Senate Office Building, Washington, D.C.

DEAR SIR: The American Patent Law Association is a national organization of lawyers having about 2,300 members scattered throughout the country and whose primary interests are in patent, trademark and copyright matters. We received notice of your hearings on December 8 and 9 and arrangements were made for a member of our board of managers to attend those hearings as an observer. We were advised that it would not be possible for us to have a witness appear at the hearings and testify and that only written statements could be submitted because the time allotted for the hearings had been fully allocated to various witnesses. We are, therefore, submitting this brief statement for your consideration.

The stated purpose of the hearings was to consider Government patent policies and their effects on small business. You are to be commended for giving consideration to this problem. The patent policy of the Government, in view of the tremendously expanded research and development activities of the Government, is especially important from the standpoint of small business; but one of the problems which you have doubtless encountered in your studies is a determination of just what our Government's policy is in respect of patents. There is no uniformity in this policy either as regards inventions made by Government employees or inventions made under Government contracts. That policy varies from department to department and from the unrealistic, stringent provisions of the Atomic Energy Act to the more realistic Department of Defense regulations and the indefinite provisions of the National Science Foundation Act. Recently, we have had a new policy declared by the National Aeronautics and Space Act which introduces into new and extremely broad areas of technology a patent policy requiring vesting in the Government title to inventions made under Government contracts. Therefore, the impact of each of the varying policies on small business should be considered. As a result of these wide variances and particularly as a result of the strong criticism of section 305 of the National Aeronautics and Space Act, there have been indications of an interest in legislating a more uniform Government patent policy. The framing of such a policy in terms which will clearly serve the best interests of the public, and especially small business, will require a high degree of understanding within Congress of the true function of patents in our dynamic economy. This makes it urgent that all relevant knowledge be made available to those legislators who will be involved in this policy determining effort.

In recognition of this need, the National Council of Patent Law Associations comprising the representatives of 27 regional associations from all parts of the country has created a special committee to study Federal Government policies with respect to inventions and patents and to disseminate its findings to all interested persons, including those in the legislative and executive branches of the Government. This committee has been designated as the Government Patent Policy Study Committee. It is not confined to members of the bar but includes representatives of industry and Government. It is the plan of this committee to systematically survey the different patent policies of the various agencies of the Government, to evaluate by case histories the actual impact of these policies upon the American economy, and to attempt to develop practical criteria by which existing and proposed Federal Government patent policies may be soundly appraised both in Congress and in the executive branch. This study committee was created only recently and its work has just been undertaken. It is hoped that this study will supply to committees, such as yours, factual data upon which they can predicate conclusions in the area in question.

In view of the widely varying policies of the different agencies and branches of the Government, it is impossible to consider them in detail. However, it may be said that there are two fundamental policies involved. Under the first, the Government takes title to the inventions made by its employees or by others under contact with the Government. Under the second, title to inventions is

allowed to go to the Government employee or to the contractor subject to a nonexclusive license in the Government for Government purposes.

It is our firm belief that the public interest will be best served and the constitutional purposes of the patent system best achieved by the vesting of title to inventions made by Government employees, including those carrying out Government research programs, and inventions made under Government-financed research and development contracts in private ownership (as distinguished from Government ownership) subject to a nonexclusive, royalty-free license in the Government for Government purposes rather than by vesting title and control of such inventions and patents issued thereon in the Federal Government. This policy, of course, is best from the standpoint of the Government because the Government interest and the public interest are one and the same. It is also the best policy from the standpoint of the inventors and patent owners irrespective of whether the inventor or patent owner is an employee of the Government or is one who has undertaken Government research on a contract basis. The incentive to invent and the incentive to invest in new developments will be furthered by this policy and stifled by any other policy.

The converse of the policy just mentioned, namely, Government ownership of patents on inventions made by Government employees and Government ownership of inventions and patents flowing from Government-sponsored research by industry, serves no useful purpose and is basically unsound. The proposition that the U.S. Government through its Patent Office can issue to itself a patent giving it the right to exclude the public generally from practicing a patented invention flowing from expenditures of taxpayers' money is basically unsound. To our knowledge, the U.S. Government has never sought to enforce the exclusive rights under any Government-owned patent. Looking at the matter realistically, Government-owned patents are completely removed from the operation of the patent system. Requiring Government employees to assign their inventions to the Government can only serve to drive these underpaid public servants from Government research into private research at salaries several times what they can earn in Government work. We are certain that a survey would demonstrate the soundness of this view and that if ample time were available, many case histories could be laid before you involving the Government's loss of many highly talented persons because they were unwilling to go on at low salaries and no extra compensation in the form of royalties or otherwise for inventions made by them. Requiring Government contractors to assign patents and inventions to the Government cannot benefit the public interest and will serve to rob such contractors of some of the incentive to invent and certainly some of the incentive to invest in projects designed to make available to the general public some of the fruits of their efforts in connection with such inventions. No Government contracts of the type in question of which we are aware provide for extra compensation for the making of inventions (which can only result from efforts above and beyond the skill of the artisan) in the performance of the contract. It is only right and proper that this should be done; and it can be done best and at the least cost to the Government by having the contractor retain title to such inventions, subject, of course, to a license to the Government.

It has been demonstrated repeatedly that small businesses have been founded upon and were dependent upon the protection afforded by the patent system. Hence, the only conclusion which can be reached is that the policy of vesting patents and inventions in the Government is more harmful to the individual inventor and the small business than to the larger businesses. It is harmful to both small and large businesses but the small ones suffer most from this untenable policy. It has been asserted that the three basic values of patent ownership by the Government, from the Government's standpoint, are (*a*) the immunity value, (*b*) the pecuniary value, and (*c*) the exclusionary value. These alleged values are wholly illusory. The so-called immunity value means nothing because it is of no greater value than the nonexclusive, royalty-free license the Government gets. The pecuniary value is likewise of no consequence because any offer from the Government of licenses or sales to others will have no takers until such time as the Government should decide to enforce patents by suits against infringers. This has never been done. The so-called exclusionary value is directly related to actual exercise of the right of exclusion which the Government has never attempted to exercise and probably never will and most certainly never should.

The thought has been expressed that the Government should take title to patents and then dedicate them. Any such practice would involve the foolhardy situation of the Government, through its Patent Office, granting a patent to itself,

and then turning around and dedicating it to those constituting the Government, namely, the public. Moreover, any such suggestion strikes at the heart of the patent system and the constitutional provisions under which it has been established and the long and well-recognized history demonstrating the tremendous value of that system to the growth of the economy of this country.

We wish to express our appreciation of the opportunity to present our views in this communication.

Very truly yours,

WILLIAM H. WEBB, *President.*

APPENDIX VI

LETTER FROM REYNOLD BENNETT, EXECUTIVE PATENTS COMMITTEE, NATIONAL ASSOCIATION OF MANUFACTURERS OF THE UNITED STATES OF AMERICA, NEW YORK, N.Y.

DECEMBER 7, 1959.

Hon. RUSSELL B. LONG,
Senate Office Building,
Washington, D.C.

DEAR SENATOR LONG: This is with reference to the Senate Small Business-Monopoly Subcommittee hearings December 8–9, relating to patent rights under Government research and development contracts. Because of the magnitude of the subject involved, it is hoped that no conclusion will be reached on isolated instances, and without a full and comprehensive inquiry into the many aspects of the matter.

It should be noted that the National Association of Manufacturers consists of some 20,000 members of which 83 percent have less than 500 employees, and 28 percent have less than 50 employees. Moreover, our policies in relation to the subject at hand have the unanimous approval of NAM's entire patents committee.

At this time, we note particularly that the normal patent laws are essential to industrial incentives and the greatest progress in the useful arts. The limitation of patent rights under Government research and development contracts would operate to discriminate against the public interest and especially against small businesses.

To point out briefly one aspect of the entire matter, smaller companies are normally more heavily dependent for existence upon a single important patent right than are their larger competitors. To illustrate this, it might be noted that if a reasearch and development contract is awarded to one of the large companies (e.g., in the computer field) the ownership of any resulting patent would be of minor significance in relation to the body of patents already owned by such a company. If it is awarded to a very small contractor, on the other hand, the ownership of the resulting patents and the opportunity to engage in commercial exploitation thereof are likely to be of primary importance to such a company. Considering the prospect of eventual commercial development of related products, the small company, if awarded the development contract may eventually be enabled to use the commercial rights in the resulting inventions to overcome, wholly or partly, the patent advantage held by large companies with their great numbers of background patents.

We would appreciate having this letter entered into the record of your hearings and would be pleased to discuss this matter more fully with your subcommittee at your early convenience.

Yours respectfully,

REYNOLD BENNETT,
Executive Patents Committee.

APPENDIX VII

LETTER FROM J. P. PERRY, PRESIDENT, EASTERN ROTORCRAFT CORP., DOYLESTOWN, PA., WITH ACCOMPANYING STATEMENT FOR THE RECORD

DECEMBER 18, 1959.

Senator HUGH SCOTT,
Senate Office Building,
Washington, D.C.

DEAR SENATOR SCOTT: This is to acknowledge and thank you for your letter of December 10 regarding my interest in the study being conducted by the Monopoly Subcommittee of the Senate Small Business Committee.

In accordance with your suggestion that I submit a statement for presentation to this committee, I am forwarding, herewith, an expression of my views together with a somewhat generalized review of this concerns experiences in this field. I have refrained from providing specific cases since I feel that quite possibly this subject matter perhaps more properly belongs in a field other than that now being handled by this subcommittee. I note from your letter that you also are inclined to share this view.

As you will no doubt appreciate, I have discussed this matter at some length with Congressman Curtin; and I am taking this opportunity to supply you with a copy of a recent letter to him dealing with specific cases. Quite possibly this information will be of interest to you in your study of this matter.

I understand that the Strategic Industries Association has or will introduce into the next Congress certain leigslative recommendations ot help correct current patent law practices in military contracts. Briefly they will consist of the following:

1. That section 305 of the Space Act of 1958 be withdrawn and substitute, with minor modification, the language of section 9, ASPR.

2. That all acts of Congress containing restrictive patent clauses in conflict with article 1, section 8 of the Constitution be similarly amended.

3. That Congress, by formal legislative action, reaffirm the constitutional guarantee of the citizen's exclusive right for a limited time to the fruits of his inventions and discoveries.

I believe on the basis of our experience in this field that the foregoing recommendations would provide substantial correction to this matter as such effects this concern.

I would like to take this occasion to acknowledge the helpfulness and interest shown by your Mrs. Guyon in connection with my attendance at these hearings.

Sincerely yours,

J. P. PERRY, *President.*

PREPARED STATEMENT OF J. P. PERRY, PRESIDENT, EASTERN ROTORCRAFT CORP., DOYLESTOWN, PA.

To the Chairman and Members of the Monopoly Subcommittee of the Senate Small Business Committee:

I appreciate the opportunity to submit to your committee a statement reflecting the experiences and the views of this concern in connection with various phases of the current study of Federal patent policies.

Eastern Rotorcraft Corp., Doylestown, Pa., which I represent as president, was founded in 1947 and is a small business activity. This concern has an average annual employment of 100 persons and average annual sales of $1,500,000. A major portion of its current sales is to the Department of Defense.

This company's present product line consists principally of mechanical or electromechanical equipment for use in accomplishing the following tasks:

(*a*) Securing airborne cargo.

(*b*) Securing aircraft to aircraft carrier decks.

(*c*) Transporting external cargo by helicopter.

(*d*) Adjusting and retaining guy wire members in portable antennae systems.

While this concern has from time to time sought and obtained Government-sponsored research and development programs its experience in the processing of such contracts has been generally discouraging. On some occasions the cost of preparing and submitting proposals has been nearly as great as the cost of actually developing the end-item called for by the contract. In addition, the details associated with proposal submittal, proposal evaluation and contract award have often been as great as the time required to actually develop the hardware in question. A further deterrent, with regard to Government-sponsored R. & D. programs, is that under the contract terms the contractor is obligated to develop a design bearing a close relationship to that outlined in his proposal. As is often the case during the course of development, new and improved solutions are generated, which are so superior as to suggest abandoning the approach set forth in the contract. Attempts to revise the contract so as to have it read on the new concept are not easily

accomplished; and accordingly the contractors is discouraged from introducing the improved solution. Under the conditions of a company-sponsored program the old solution would be quickly abandoned in favor of the new design with corresponding savings in time and energy.

In our field of endeavor, and from our observation we feel it likely to be the case in other fields, a new patented item merely represents a new and superior way of doing an old job; or a way of doing a new job which heretofore could not be accomplished with existing equipment. We do not, in all honesty, believe that other solutions do not exist to those jobs which are accomplished by our patented equipment. Indeed, we know of no instance in which if someone else had a patent on one of our devices, we could not design an equally effective piece of hardware without infringing on his patents. In furtherance of this reasoning, we believe it unfair and unrealistic to necessarily hold the position that a patent automatically creates a monopoly of any significant consequence.

It has been our experience and observation that patents held by large business have in no way adversely affected the progress and operation of this concern; and we are inclined to believe that commanding patent positions on the part of large business do not necessarily as such have an adverse effect on small business. We do, however, feel strongly that patents can and should provide a degree of protection and encouragement necessary for the growth of creative small business. Our society traditionally has looked to this segment of small business for leadership in the development of many of its new products and industries. Competition to creative small business comes not from large business but from other small businesses who have neither the ability nor the desire to introduce new and necessary improvements.

Under the circumstances presently existing, the developer concerns are at the mercy of all other concerns in connection with Department of Defense procurement. This is especially true if the developer concerns have relatively large and aggressive product development programs since they cannot possibly hope to match the production costs of those companies not having a similar development cost burden. As your committee no doubt knows, in the event of infringement in connection with a Department of Defense procurement, the patent holder's only legal recourse under statute (title 28 U.S.C., sec. 1498) is against the Government in the Court of Claims. This situation, therefore, prevents a leveling of any cease and desist action against the infringer; and results accordingly in forcing the patent holder into the normally unrewarding program of litigation against the Government. In the case especially of the smaller concerns such litigation requires time and energies which might better be spent on its continuing creative programs.

The circumstances noted above are not hypothetical since several of the products designed and patented by this concern with its own funds are presently being manufactured by others in such exact form as to appear to have been made by the patent holder. Efforts to obtain relief from these damages have not to date been successful. The attitude on the part of the infringer has often been one of blatant disregard of the patent holder's position since he well nows that the patent holder's only legal recourse is against the Government.

In summary, therefore, this organization does not believe that the monopoly supposedly created by the placement of extensive research and development contracts with large business is as great as has been visualized, nor does it have an aggregate adverse effect on small business as has been indicated by the Attorney General. Further, in this regard, it is believed that the creative portion of small business has been and continues to be adversely effected by Federal patent policy, particularly as such policy applies in the field of Government procurement. It is believed that if favorable circumstances were created by the Government that small business would develop with its own funds a virtual flood of new and improved materiel, beneficial not only to our military effort but also to our society as a whole; and this unquestionably desirable segment of small business asks for no special privileges—only fair treatment and encouragement.

APPENDIX VIII

PREPARED STATEMENT OF ROBERT A. BICKS, ACTING ASSISTANT ATTORNEY GENERAL, ANTITRUST DIVISION, DEPARTMENT OF JUSTICE

DECEMBER 7, 1959.

Hon. RUSSELL B. LONG,
Chairman, Subcommittee on Monopoly,
Senate Small Business Committee,
U.S. Senate, Washington, D.C.

MY DEAR SENATOR LONG: I am happy to transmit in accordance with your request of November 18, 1959, the views of the Department on Government policy as to rights in patents resulting from Government research and development contracts.

First, a necessary preliminary is definition of antitrust concern with the problem. Second, the development of the problems of Government research policy is briefly sketched. Third, some general observations are presented.

I

Industrial research, and the patents which flow from it may affect competition. The patent system, with emphasis on commercialization of the new commodity, the new technology or the new source of supply, seeks constantly to renew competition to established products and producers. Concomitantly, active competition in industry provides the best climate for industrial research, as companies strive against each other to bring new products from the laboratory to the production line. And so long as a company exploits its patents consistent with the terms of the patent grant, without abuse for anticompetitive purpose, antitrust and patent policy do not cross.

Patent abuse or misuse as part of an anticompetitive arrangement, however, will invoke antitrust. Particularly prejudicial to competition is domination of related fields of research by a few large companies, for the conscious engrossment of all vital patents covering an industry field by one or a few companies may stifle competition.

In the 18 years since the first modern antitrust judgment containing patent relief was entered in 1941,[1] almost 1 of every 3 judgments have included provisions requiring compulsory licensing or dedication of patents. Included are not only cases of simple patent abuse involving one or two patents, but those where aggregations of patents dominate an entire industry.

Antitrust enforcement tools, carefully used, can remedy anticompetitive patent abuse, as other antitrust violations. For example, since the Eastman Kodak judgment [2], giving access to color film processing patents, more than 50 companies now compete for the color processing previously done by one. Manufacture of concrete blockmaking machinery, controlled by Besser Manufacturing Co. before 1949, is now shared by more than a dozen companies after an antitrust decree [3] opened up Besser's patents. The glass fiber products industry, the domain of Owens-Corning Fiberglas Corp. before an antitrust judgment compelled licensing under some 260 patents, has now some 72 licensees in the business. And the amassment of patents, inventions, and know-how on electronic and mechanical data processing equipment by IBM, alleged in the 1952 antitrust complaint,[4] required compulsory license provisions in the 1956 decree; and the resulting competition by many licensees has aided the rapid growth of this modern industry.

In line with this objective and consistent with antitrust goals, Government's influence in advanced research should be shaped to promote free enterprise competition.

II

Industrial research as an organized activity is relatively recent to American industry. General Electric first instituted industrial research as a regular and independent activity in 1900. Government's role in industrial research is even more recent, assuming significant proportions just before World War II.

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[1] *United States* v. *Kearney and Trecker,* Civil 3337 (N.D. Ill. CCH Trade Cases 1940–1943), p. 571.
[2] *United States* v. *Eastman Kodak Co.,* Civil 6450 (W.D.N.Y.).
[3] *United States* v. *Besser Manufacturing Co.,* 96 F. Supp. 304 (E.D. Mich. 1951); affd. 343 U.S. 444 (1952).
[4] *United States* v. *International Business Machines Corporation,* Civil 72–344 (S.D.N.Y.).

By about 1938, the annual cost of our country's industrial research was approximately $300 million. By 1941, it had doubled, and since World War II has had a mushroom growth. In 1956, total expenditures for industrial research and development reached the considerable sum of $6.1 billion, reported as increasing to $8.2 billion in 1958.

Future growth, too, promises to be rapid. According to a recent survey,[5] industry was increasing its research and development expenditures for 1959 to over $9 billion, which represents an increase of 50 percent since 1956, and projects spending at the rate of $10.6 billion by 1962. Strikingly, it expected that at least 10 percent of the 1960 sales volume, for manufacturing as a whole, would be in new products not made in 1956.

Today, with industrial research a deliberate instrument of economic development, industries compete constantly to create new wants, new products to satisfy them, and thus new markets apear. Competition in fact begins in the laboratory. This kind of competition, called "the new competition" or "the quiet competition of the laboratory," is an effective part of business survival in a competitive world. As one business executive said, his company's experience showed that "every dollar spent to develop new products and improve technology earns approximately $5 in return." [6]

Government's part in industrial research has become major. Although, according to a recent estimate of the National Science Foundation, 72 percent of scientific research is actually performed by industry, Government pays more than half of its cost. A share of industry's work for Government, too, depends upon information as to technical matters in Government's hands, much of which security requires to be classified against access by industry generally. Thus, the policies of Government in distributing research work and the patents which flow from it are especially significant.

Advantages accruing to any company performing Government research are numerous. First, it gets a fee for the job. Beyond that, it gains know-how in new products developments, or in the use of new raw materials and processes to manufacture existing products. It may also gain knowledge in new uses of existing products of competitive significance.

The company performing research may further benefit from resulting patents, by obtaining a legal monopoly over the subject of its invention—the power to exclude others from the field. Moreover, companies able to have important technical research programs financed for them can attract scientists and engineers, providing a staff for the future. During nationwide shortage of the scientifically trained, this is a substantial advantage. Finally, Government work may give access to vital restricted data, not available generally for sound security reasons.

Relevant Government agency patent policies vary widely. The agencies of Department of Defense, with wide discretionary authority, normally take only a royalty-free nonexclusive license under patents resulting from research it finances. Atomic Energy Commission, and the new National Aeronautics and Space Administration, on the other hand, are governed by statutes requiring in the main that inventions made in the course of their research shall be the property of the United States.[7] The National Aeronautics and Space Act, moreover, requires effective contract provisions for reporting technical information discovered in the course of their performance. The NASA legislation also grants the Administrator broad powers for protecting title to patents, for establishing conditions on which licenses may be issued, and for waiving the rights of the United States upon a determination that the interests of the United States will be served thereby. Other agencies follow variations on these basic policies.

Since World War II, agency patent policy has been the subject of two studies by the Department. In 1947, the then Attorney General urged full Government ownership of all patents resulting from Government contracts.[8] In summary, that report urged this policy, with few exceptions, as being in the public interest to assure free availability of the technology to all American industry, not just

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[5] McGraw-Hill Publishing Co., 12th Annual Survey on Business' Plans for New Plants and Equipment (1959), p. 13.

[6] M. W. Boyer, director, Standard Oil Co. of New Jersey, quoted in Oil and Gas Journal, Nov. 16, 1959, p. 131.

[7] Atomic Energy Act of 1946, as amended, 68 Stat. 944 (1954), 42 U.S.C. § 2182 (1958); National Aeronautics and Space Act of 1958, § 305, 72 Stat. 435 (1958).

[8] 1 Atty. Gen. Rep. 87–88 (Investigation of Government Patent Practices and Policies) (1947).

the immediate contractor; to avoid undue concentration of patents in the hands of a few large corporations; and to prevent possible suppression of inventions paid for by the public.

In November 1956, a report of the Attorney General under the Defense Production Act considered this recommendation and the opposing views of the National Patents Planning Commission.[9] That Commission, with the War and Navy Departments and the Office of Scientific Research and Development, opposed Government ownership. They feared that such a policy would increase the difficulty and expense of obtaining contractors able and qualified to undertake urgent defense research and development projects. Many Government contractors, it was asserted, felt that Government payment did not cover the whole outlay of the ordinary research and development contract, meeting only immediate material and labor costs and some overhead, plus a small profit, leaving the contractor to furnish his previous investment of time, money, and personnel in the particular field of research.

The 1956 report attempted factual analysis of the problem as the prerequisite of fair solution. As it noted, however, the complexity and volume of the Government's research needs and the urgency of much defense-related research, made analysis extremely difficult. It noted lack of data adequate to indicate the full scope of the problem, particularly with respect to industry's reaction to the differing policies of the important research agencies. It concluded that further careful study of the economic and defense questions presented by the agencies directly responsible, was warranted to elicit, if possible, the needed data.

Following that recommendation, the agencies concerned formed a study group under the Interagency Task Force for Review of Governmental Procurement Policies and Procedures to make a comprehensive review of Government patent policies and problems. The study group, by industry interview and questionnaire, has explored many facets of the problem. However, none of the approaches used resolved the basic complexities of the matter, or seemed to afford the means of achieving adequate factual basis for solution. At this juncture, it recommended a pilot study by George Washington University to recommend basic techniques for its solution. Pending completion of that pilot study and evaluation of results, the study group has not concluded its review or submitted findings or recommendations.

III

Legislative action, we urge, should await completion of this study. For relevant factors are complex. And resolution of conflicting considerations might well be aided by the judgments and experience of the study now underway.

For example, the unusual complexities involved in the letting of research contracts may argue strongly against a detailed and precise legislative solution to the problem. Maintenance of a competitive economy is a most important objective. But so is defense; and the latter may have overriding necessities in particular situations. Such conflicts, then, must be handled carefully, with discretionary executive authority ample for flexible action.

However, Government research contracts with a company most frequently fall into the field of that company's previous work. A fair policy should allow account to be taken of previous investment of capital and time by the research contractor. A contractor close to reduction to practice of an invention at the time of initial Government interest and financial assistance seems quite differently situated than one undertaking an entirely new line of research at Government insistence.

Finally, satisfactory solution of the problem must recognize the need for fairness to the Government research contractor's competitors and the consuming public. Even with exceptions for stringent necessity, basic policy should recognize the requirements of future competition. Unavoidably, the use of a particular contractor for Government work will give him a future advantage in know-how. Whether, as a matter of course, he should also be given the right to exclude others from that technology, absent special necessities, seems more dubious. If research contracts and patent right grants could be equally distributed across the whole spectrum of competitors, no antitrust problem would be presented. Indeed, the resulting spur to commercialization of new developments might well be an aid to vigorous competition.

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[9] Report of the Attorney General under the Defense Production Act, Nov. 9, 1956, pp. 48–53.

Indications are, however, that Government research does tend to lodge in the hands of a relative few companies with immediate research capabilities and large resources. Defense requirements cannot always be held in abeyance pending a contractor's assembling the necessary facilities, even if he demonstrates satisfactorily his ability to do so. And, in a recent year, the totals reported by Defense to the Congress for certain contracts [10] for experimental, developmental or research work correspondingly show a heavy proportion of such contracts—over two-thirds—currently held by some 25 companies. While this, of course, would include substantially all of the industries manufacturing military aircraft and missiles,[11] it also includes major members of other industries. This fact cannot be ignored in appraising alternative solutions to the problem of patents growing out of Government financed research.

Sincerely yours,

ROBERT A. BICKS,
Acting Assistant Attorney General, Antitrust Division.

APPENDIX IX

PREPARED STATEMENT OF CHARLES W. STEWART, PRESIDENT, MACHINERY AND ALLIED PRODUCTS INSTITUTE, WASHINGTON, D.C.

DECEMBER 29, 1959.

HON. RUSSELL LONG,
Chairman, Subcommittee on Monopoly, Select Committee on Small Business, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: We appreciate very much the opportunity to present the views of the Machinery and Allied Products Institute and its affiliate organization, the Council for Technological Advancement, in connection with current subcommittee hearings on the patent policies of Federal departments and agencies.

As you may know, MAPI and CTA represent capital goods and allied product industries of the United States. Although the companies which constitute these industries are engaged for the most part in commercial—as contrasted to defense or other governmental—production, their existence and their progress are so thoroughly dependent upon the protection of patent rights and related proprietary technical information that they have a deep and continuing interest in the matters now under review by your subcommittee. To put it differently, capital goods and allied product industries might properly be called engineering industries, and the continuing excellence of their products is in large measure attributable to the opportunities offered and the security of investment guaranteed by the American patent system.

Your statement of December 8, 1959, identifies three questions to which the subcommittee is giving major attention currently. In order that our statement may be responsive to the purpose of the inquiry and because we think each of the questions posed deserves the attention now being given it, we repeat those questions in paraphrase:

1. Has the granting of patent rights to individual firms for discoveries which result from or are related to Government research and development contracts tended toward increasing economic concentration?

2. Is newly acquired technological information developed at Government expense and not of a classified nature diffused promptly and fully throughout our society?

3. Is the U.S. Government getting all it pays for from its research and development dollar? This issue includes two related questions, namely: Is the Government giving away more than it should in the granting of its research and development contracts, and is it possible to recover part, or perhaps all, of the Government's expenditures on research and development?

We agree, of course, with your conclusion that the magnitude of Federal moneys spent in this field makes it appropriate that the Congress should examine these questions most carefully. Before considering these questions directly, we

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[10] Those negotiated under the authority of sec. 2304(a)(11) of the Armed Services Procurement Act. 10 U.S.C. 2301(a)(11).

[11] Report of the Attorney General under the Defense Production Act, No. 9, 1959, pp. 63–74.

think it would be useful to describe briefly just what it is that we are talking about.

Just what are we talking about?

The term "Government-sponsored research and development"—the alleged abuses of which form the subject of this inquiry—covers a wide variety of research activities and contracting situations and is capable of no very accurate definition. Such work may range from basic research into fundamental scientific laws or truths to advanced development of existing articles or processes. As for contractual arrangements, Government sponsorship may range from a cost-plus-a-fixed-fee contract through a bare cost-reimbursement agreement (no profit) to an agreement under which the private contracting party is authorized simply to use certain Government facilities or personnel.

The subcommittee is now considering the varying policies of Federal agencies in respect to the disposition of patent rights in inventions which may result from such work, and particularly rights in patents having possible commercial value.

Under the most favorable of these arrangements from the contractor's standpoint, the cost-plus-a-fixed-fee contract, the contractor is by no means completely reimbursed for his real costs incurred in contract performance. Under recently revised section XV of the Armed Services Procurement Regulation, for example, numerous out-of-pocket expenses, customarily and regularly allocated to all elements of current business activity for both business reporting and tax purposes, are expressly "disallowed" for contract purposes. In fact, Government acknowledges the reality of these costs from a business standpoint but nevertheless disallows such costs for a variety of reasons. Similarly, the Atomic Energy Commission—some 5 years after adoption of the liberalized depreciation provisions of the 1954 Revenue Code—has refused to allow anything more than properly allocable portions of straightline depreciation as a contract cost. (This, it should be noted, is only one example of AEC contract cost disallowance.)

We call attention to these facts only to emphasize that research and development contractors—after charging unreimbursed expense against the agreed fee for contract performance—are performing work which the Government must have done for it at little or no profit, and, in many cases, at an actual loss.

Aside from patriotic motives—which are a very powerful force in American industry—can it be expected that private firms, whose function and purpose is the making of profits for their proprietors, commit their resources—material and human—to business which promises, at best, a very low return on investment? Heretofore—in the case of the Department of Defense—there has existed as an additional incentive the possibility of the contractor's acquiring valuable patent rights or know-how, subject always to a royalty-free, nonexclusive license in favor of the Government.

In summary then, we are discussing the propriety, the efficacy and the long-range effects of a system—or a variety of systems—by which the Government acomplishes necessary research and development activity.

Some basic objectives

In undertaking any full-dress review of Government patent policy, it seems to us that there are certain basic objectives which must be kept clearly in view at all times. These objectives—a combination of security, economic and social goals—are not necessarily consistent one with the other. Indeed, they may at times be mutually contradictory; hence, it seems to us that this inquiry and any legislative recommendations which may result from it must undertake an accommodation of these conflicts and a balancing of the broad objectives set out below:

1. Above all else, the Government system of research and development must contribute to the military results which are imperative in the present circumstances. (In broader terms, does the system make a maximum contribution to the increase and diffusion of human knowledge, these being essential preconditions to technological advancement?)

2. Having due regard for the first objective set out above, the Government procurement patent policy should result in the fairest possible division of Government research and development work among properly qualified firms without reference to size.

3. Insofar as possible, Government procurement patent policy should avoid disruption of Government-industry relations and present contracting patterns.

4. Government procurement patent policy should preserve, and if possible enhance, private incentive—both individual and business—to pursue scientific and technical inquiries of potential benefit to Government and to the community at large.

5. Government procurement patent policy should encourage the prompt and efficient utilization for peaceful purposes of new technology developed under research and development contracts.

6. To avoid possible socialization of what may become basic industries of the future, Government procurement patent policy should not be so framed and administered as to result in monopoly Government control over rapidly developing new and exotic technologies important to national defense and national prestige—with possible future peaceful applications of great commercial value—and the launching of which require immense sums of money both public and private.

7. Government procurement patent policy should not be so administered as to subsidize the incompetent and the unfit.

With these very broad objectives in mind, let us consider briefly the present policies of certain Federal agencies with respect to patent rights to inventions first conceived or reduced to practice during performance of Government-sponsored research and development. Before proceeding to this review, however, we should briefly take note of the fact that certain of the testimony in this hearing engages not only questions posed in the distinguished subcommittee chairman's release of December 8, but the social, economic and technological efficacy of the American patent system itself. This may not be the proper forum in which to debate this broader issue fully, but since these points have been raised we shall from time to time in our statement attempt to deal with them.

Present patent policy of Federal departments and agencies

The Department of Defense.—In recent testimony before your subcommittee the Deputy Assistant Secretary of Defense (Supply and Logistics), Mr. James P. Falvey, in commenting on the Department's general policy of acquiring a royalty-free, nonexclusive license rather than full patent rights to inventions conceived under research and development contracts, had this to say:

"Historically, the patent policy of the Department of Defense was and is the result of operating experience of the Department and military departments prior to the establishment of the Department of Defense. * * * The [Department's regulation on this matter] was promulgated on July 1, 1949, and incorporated the principles which the military departments had found through their experience to be most workable and effective to meet their needs. * * * [The regulations were revised in January 1955 to move] farther from the title concept to the license concept. Our experience under the present policy has been good and no changes of concept are needed to satisfy Department of Defense requirements."

Significantly, Mr. Falvey's testimony asserts not only that the military departments have found present Department of Defense patent policy "most workable and effective to meet their needs," but his testimony traces in some detail the history of the policy's development and supports its continuance with the testimony of a number of distinguished Department of Defense officials whose combined tenure of office covers almost the whole of the post-World War II period. Moreover, his testimony on this question describes the experience of that Federal department which has had by far the most experience in the use of research and development contracts.

The National Aeronautics and Space Administration.—The National Aeronautics and Space Act of 1958 directs that inventions made in the performance of a contract with NASA shall be the exclusive property of the United States whenever certain determinations in respect to such inventions are made by the Administrator of that Agency. This act has now been in effect for a little more than a year.

In recent testimony on this question before a subcommittee of the House Science and Astronautics Committee (the substance of which has been repeated before this subcommittee), the General Counsel of NASA, Mr. John A. Johnson, has requested substantial amendment of the act's patent policies which would permit the exercise of administrative discretion rather than requiring an automatic acquisition of full patent rights where certain conditions exist. In explaining his recommendations the General Counsel stated:

"In order to assure itself of the continuing willingness of contractors to participate in projects of great national importance, NASA desires that it be given

discretionary authority to adopt contractual patent provisions in line with those of the Department of Defense where necessary to meet the equities of the situation.

* * * * * * *

"Finally, there is the adverse reaction of contractors themselves to the patent provisions of the act. While the opposition may, in the typical case, be overcome in the process of negotiating a contract, it can retard the placing of important research and development contracts. Moreover, NASA would prefer to be dealing with willing contractors, competitively eager to participate in the research and development necessary to advance the Nation's space efforts."

We think the General Counsel's last statement deserves reemphasis. He expresses a clear preference on the part of NASA for dealing with willing contractors, competitively eager to participate in the research and development necessary to advance the Nation's space efforts. Especially noteworthy is his clear implication that present policy tends to inhibit private incentive.

Atomic Energy Commission.—The Atomic Energy Commission has since its organization followed a policy of acquiring all rights in inventions and discoveries in the atomic energy field where a "relationship"—as described in section 152 of the Atomic Energy Act of 1954—exists between the contractor and the Commission even though Government funds may not have been directly employed in achieving the discovery. This policy has been followed, moreover, not only in research and development contracts but in fixed-price bid supply contracts.

Evidently, the Commission feels that the acquisition-of-full-title policy has served the public interest in the development of atomic energy as evidenced by the statement before your subcommittee by Mr. Roland Anderson, AEC Assistant General Counsel for Patents. However, in recent testimony before the House Committee on Science and Astronautics, Mr. Anderson asserted in response to specific questions regarding contractor experience with the AEC patent policy:

"I think I also have to recognize that there are many of our contractors who would prefer that we follow the Department of Defense policy. But I do not believe that I can say that any of those have refused to take an AEC contract by virtue of the present policies of the Commission. I think that from my own personal knowledge that there have been several contracts that were not consummated by virtue of the contractor taking the position that he did not want to take on research work which would jeopardize his own personal position in the field because of our patent policy."

If Mr. Anderson's testimony has been correctly recorded, the evidence as to the efficacy of AEC patent policy would seem to be—even in the Commission's view—inconclusive as to the willingness or unwillingness of potential contractors to undertake research work for the Commission because of patent policy.

Although the Commission itself may be uncertain as to the incentive or disincentive effects of its patent policy, industry appears to have a clear and definite conviction on the point, at least on the basis of information available to the Institute. As indicated in the attached copy of the Institute's transmittal of May 6, 1959, of its statement to the Subcommittee on Legislation, Joint Committee on Atomic Energy, certain capital goods manufacturers—including a number of key atomic reactor manufacturers—would welcome the opportunity to testify before interested committees of the Congress on the extent to which AEC patent policy has blunted the drive for research and further development and continued technological progress in the atomic energy field. It should be noted, moreover, that great concern has been expressed, both in Congress and by private authorities, at what appears to be a slower-than-expected rate of progress in the development of atomic energy for peaceful purposes; this unacceptable rate of progress is attributed by at least some authorities to AEC patent policy. For example, Mr. Jo Baily Brown, member of the Patent Advisory Panel to the Atomic Energy Commission, in his memorandum of December 5, 1958, has this to say about present Commission patent policy:

"The present atomic energy patent statute substantially lessens the normal incentive to invent and to exploit patented inventions in the atomic energy field. I believe he substantial limitation of such incentive by the present law and practice has retarded, and will continue increasingly to slow invention, improvement, and industrial applications of atomic energy in this country, and

will hamper our citizens in their efforts to obtain business in this field in foreign countries."[1]

This makes it timely to suggest that a reexamination of the connection between Commission patent policy and our rate of development of peaceful uses of atomic energy is desirable.

Other Government patent experience.—In this very brief review of widely divergent patent policies within Federal agencies we have attempted to focus attention on those areas where the greatest sums of Government research and development money are spent and which includes also those areas where the Nation is involved in a deadly competition with the Soviet Union—in missiles and other military weapons, earth satellites, space vehicles, and atomic energy.

Our summary of Federal agency experience does not include such Departments as Agriculture, Health, Education, and Welfare, Post Office, and a number of other departments and agencies which have adopted individual patent policies which fall within the purview of the subcommittee's investigation. None of these other agencies, however, has the responsibility for national security and international prestige entrusted to the Department of Defense, the National Space Agency, and the Atomic Energy Commission. Moreover, various as their respective patent policies are, the substance of these differing policies is generally included within the range of policy discussed above. Hence, they are not separately discussed in this statement.

With this background of current Government patent policy in mind, let us consider in some detail the three principal questions to which the subcommittee's inquiry is directed.

The problem of increasing economic concentration

The subcommittee's release of December 8 suggests the present Department of Defense procurement patent policy has led to a "problem of increasing economic concentration brought about by the granting of patent rights to individual firms or discoveries which result from Government-financed research and development contracts."

Even if we were to ignore the industrial facts of life which confront the Department of Defense in placing research and development contracts—and we dare not ignore them—we think there is plenty of evidence to indicate that the patent policy in question has not contributed to an increasing economic concentration, but on the contrary has resulted in the creation of a whole new industry of research and development contractors, consisting for the most part of new and small businesses. We would go further and observe that the removal of private incentive necessarily resulting from the reversal of present Department of Defense procurement patent policy would almost certainly lead to an accelerated increase in economic concentration because it would tend to place beyond the reach of the new and small business a most important competitive advantage—a private patent right—for successful competition with larger and more experienced business rivals. Moreover, the economic concentration which we foresee as a result of the reversal of Department of Defense procurement patent policy is a concentration of economic power in the Government and monopoly control by political agencies over basic patent rights in new technology.

Let us consider each of these possibilities in turn.

The simple fact is that the Department of Defense and other Government agencies contract with certain firms—large and small—for the conduct of research and development work because they must. For very practical reasons the award of research and development contracts is decisively influenced in most cases by the state of preexisting knowledge possessed by the contractor in question. Obviously, the scope and character of private research efforts which have produced superior know-how may be the result of, or may be influenced by, sheer size.

The growth of small research and development firms.—If size alone were a decisive consideration in the award of Government research and development contracts, how does one explain the proliferation and rapid growth of small research and development companies in such areas as suburban Boston, southern California—and, indeed, suburban Washington, D.C.—and which growth has

[1] "Selected Materials on Atomic Energy Patents," published by the Joint Committee on Atomic Energy, March 1959. (See also other authoritative statements of similar import compiled in this volume.)

been largely accomplished under Government research and development contracts? Small companies, as well as large ones, have special talents important to Government programs and the flourishing growth of small contractors in the research and development area would seem to indicate that the Government—like any prudent buyer—has taken full advantage of all that the marketplace has to offer. Indeed, we think an examination of the growth of small companies in this field might prove that Government research and development work has been a most fruitful incubator of vigorous new business. It has, one might observe, resulted in creation of a whole new industry and would seem clearly to suggest that opportuntiy for entry into such business is being safeguarded under present Department of Defense patent policy.

Among small businesses represented in public hearings on this question are the members of the Strategic Industries Association, which are not only small businesses but, more importantly, are small defense contractors and for that reason would seem to be particularly susceptible to the alleged problems of economic concentration resulting from Government patent policy. Despite this unusual susceptibility to the ills which have been heretofore suggested, the Strategic Industries Association has presented a most forceful argument in favor of continuance of the present Department of Defense patent policy, emphasizing particularly the desirability of preserving incentive for private contractors and the inescapable interdependence of government contractors, big and small alike.

The role of patent incentives in aiding new business.—We suggest that a most important function of the exclusivity afforded by the patent system is the incentive it provides for new business, including small businesses. But for the limited monopoly provided by a patent right, a new business could rarely justify the investment necessary to enter some highly complex field of business in which a number of existing larger companies with abundant resources in money, technical personnel, and facilities may already be quite successful. A patent right may, however, justify such investment by a new company simply because the exclusive right conferred by the patent may permit the new company to attain a competitive advantage over its business rivals possessing far superior resources.

Much stress has been placed in the course of this hearing upon the fact that Government research and development spending has been concentrated, primarily, among a few large firms, particularly by the Department of Defense. Two comments seem in order.

The real problem here, it seems to us, lies in finding some way to provide greater opportunity for all business, large and small, to participate to the extent of their resources in Government-sponsored research and development work. This we believe is the very heart of the problem which has led to these hearings. We have no ready-made solution for the problem nor have we heard a sound one offered to the subcommittee. We are absolutely certain, however, that the answer does not lie in so changing Government procurement patent policy as to make impossible the acquisition of private patent rights.

As we have already suggested, there are many Government research projects of such magnitude that only a relative handful of companies could possibly undertake them. In this area it may to a great extent be impossible to spread participation in Government research and development work simply because of built-in requirements for particular qualifications possessed only by a few large companies. By the same, token, the demand for particular talents or unusual qualifications in connection with a particular research project can—and has—worked to the advantage of smaller firms, as witnessed by the rapid growth of new companies specializing in research and development work and to which phenomenon we have already referred.

Increased concentration of economic power in Government.—Finally, let us consider the problem of vastly increased economic power in the hands of Government, a condition which must inevitably result from the Government's taking all patent rights in inventions developed under research and development contracts. Dismissing for the moment the question of this result's disincentive effects on the prompt and efficient distribution of economic benefits—to which we refer at a later point in our statement—let us consider briefly the possible consequences of governmental acquisition of all patent rights in such cases. Obviously, we would have a concentration of economic resources far surpassing any conceivable aggregation of economic power in private hands. This power, moreover, would—by reason of the sources from which it sprang—be so concentrated on the frontiers of new scientific and technical discovery as virtually to obliterate private incentive for further development in those fields. The possi-

bility raises, in addition, social, economic, and political implications of such magnitude, in our judgment, as to make such a step altogether unwise.

Dissemination of newly acquired technological information

The second of the questions to which the immediate inquiry is directed is the problem of assuring that newly acquired technological information developed at Government expense and not of a classified nature is diffused throughout our society. As the subcommittee chairman's release of December 8 points out, our present national and international position requires a full utilization of all our scientific skills.

There would seem to be at least three important reasons which require the broadest and promptest possible dissemination of newly acquired technological information: national defense and international prestige, economic growth, and the distribution of economic benefits from technological advances. Suppose we consider each in turn.

National defense and international prestige.—Insofar as the dissemination of new technological information for purposes of national defense and international prestige is concerned, it would be well to remind ourselves of the nature and consequences of Department of Defense policy in respect to patent rights to inventions developed under research and development contracts. By way of repetition, the military departments insist customarily upon reserving to the Government a royalty-free, nonexclusive license to practice or to have practiced the invention in question by or for the Government throughout the world. (It should be noted that the Department of Defense reserves, and has always reserved, the right to contract for full title to patents where special circumstances make it appear undesirable from the standpoint of the national interest that patent rights be placed in private hands.)

Having received this kind of license, the Government is in a position to pass on all new technological information involved to whomever may have a need for it in the performance of a Government contract. If as a result of this system there has been a failure to distribute such information for Government purposes as widely and as promptly as might be desirable, the fault would seem to us to lie in Government's administrative shortcomings—including, possibly, a lack of clarity in pertinent contract provisions—rather than in any inherent fault in the patent licensing system of the Department of Defense. As for distribution of new technological information for commercial purposes, we doubt—as our statement makes clear at a later point—if this is a responsibility which should be vested as a matter of national policy in the Federal Government and, even if properly so vested, that the Government could do the job effectively. In any event, the desirability of prompt and widespread dissemination of new technological information for both governmental and commercial purposes must be balanced against the necessity of preserving a Government procurement patent policy which will, in the long run, produce the most rapid technological improvement.

Economic growth.—As for the role of Government patent policy—and the American patent system generally—in the economic growth of the United States, we assume as our initial premise the continuation of a private enterprise system. Proceeding from this assumption, we would observe that economic growth can only result from new investment, and investment in a free economy results only from the presence of adequate incentive. And the presence or absence of incentive—as typified by patent rights—will act as a most powerful stimulant or deterrent to the entry of new or small business into the system. It is with this problem of a small firm's entry into business that the subcommittee of course has a special concern.

In considering this question we cannot fail to consider the testimony of Professor Melman, who vigorously denies that patent incentives are necessary to technological progress and, in addition, theorizes that the patent system results in a compartmentalization of scientific and technical knowledge and thus acts as a positive drag on progress. With some considerable eloquence he inquires rhetorically:

"Who will be freer to explore the frontiers of knowledge? Who will be more daring in the application of knowledge to new designs—the men who act on behalf of the restricted goals of a single firm or those who act on behalf of the goals of a whole society?

"In my opinion it is the men who are empowered to act on behalf of the wider interests who will be least encumbered, and thereby more efficient, in the conduct of inquiry."

If we understand the import of this quotation—and we think we do—Professor Melman evidently envisages a socialization of technical and scientific knowledge, of new art, of all those matters now customarily comprehended within the general class of property rights which includes patentable inventions and proprietary technical information.

In our opinion, Professor Melman is quite wrong.

We must confess that the vision of "those who act on behalf of the goals of a whole society" is a noble one. But the whole record of our industrial society would argue that the destruction of private incentive, which the vision necessarily implies, has had a stultifying effect on economic advancement and upon scientific and technological progress. Complete freedom in the dissemination of scientific knowledge is worthless in the absence of scientific knowledge itself, and the system here envisioned is one in which everyone is responsible for progress and hence no one is. "What is everybody's business is nobody's business."

Professor Melman acknowledges, to be sure, that the "motivation of personal gain or of profit for a firm can also function as an incentive" but this grudging admission of the effect of private incentive holds that such incentive has a "restrictive effect in conduct of inquiry and in the disposition of research results."

The suggestion is advanced by Professor Melman that patent incentives are unnecessary to technological progress, since corporations would continue research toward product development and cost reduction in the absence of patent rights. Of course they would. However, this observation misses entirely a far more important question, that of corporate spending on basic research—of which there is presently a substantial and growing volume—where there is no immediate prospect of profit. In the absence of the limited right of exclusivity guaranteed by a patent, the private incentive which Professor Melman decries, we feel certain that privately sponsored basic research will be most seriously threatened.

We do not intend to pursue this argument at length since we have assumed in the beginning that the subcommittee's investigation is premised upon the continuance of a system of private enterprise. However, we cannot fail to refer to the "restrictive effect" of the private patent system to which Professor Melman has given so much attention in his testimony. In order to encourage publication of information describing new products or processes—the dissemination of new technology—the Government grants to the inventor a right to exclude for 17 years the practice by others of the invention in question. The most important reason for adopting a patent system was the increase and dissemination of scientific and technical knowledge resulting from publication by patenting. It may well be that the "restrictive effect" of the patent system is the sharpest spur of all to future technological progress.

The fact is that few patents provide for the patentees a competitively advantageous position for the full 17-year lives of the letters patent in question. In any system of free and competitive private enterprise, the existence of a patent is an immediate challenge to all competitors, actual and potential, to "build a better mouse trap" by designing around the article or processes patented or by devising—and patenting—a substitute article or process which will accomplish the end in view as well or better. And who gains by the competition thus engendered? Obviously, the United States and all its citizens stand to gain by the rapid proliferation of scientific and technical knowledge thus competitively generated.

Distribution of economic benefits of new technology.—Finally, we come to the question of the distribution throughout society of economic benefits resulting from new technological information developed at government expense. One is immediately confronted with the question of whether or not such economic benefits will be most promptly and generally made available to the public by a system under which Government grants to private contractors the right commercially to exploit new inventions or some other system by which the Government takes full title to patents involved. Suppose we consider these possibilities in inverse order.

Let us assume that a new invention is developed under a Government research and development contract and that in addition to the benefits which it confers upon the Government itself, it involves valuable commercial rights. Finally, let us assume that the Government takes full title to any patent resulting from such an invention.

Given these assumptions, the Government may do one of several things. It may license all comers to practice the invention on a royalty-free basis—a system which, in fact, has been employed by the Government in the past.[2] It may license one or more manufacturers and thus recoup a part of its original expenditure in the form of royalty payments. Finally, the Government might conceivably—although we think it most unlikely—undertake the manufacture and distribution of commercial items covered by the patent or patents in question.

Of all these possibilities, we think the first is by far the most likely since the Government has followed this practice in the past and because it could scarcely place itself in a position of favoring one or a very small group of contractors over all other competitors in the purely commercial exploitation of a patented invention. This being the most likely possibility, let us consider for a moment the probable consequences.

First of all, reservation to the Government of all patent rights destroys completely any possibility of an individual firm obtaining for itself the right to exclude others from manufacture which is the very essence of a patent right. We think it is improbable that most companies would consider undertaking this kind of a license arrangement with foreknowledge that they might face unlimited competition from other licensees of the Government, particularly, in the light of other and, potentially more profitable, investment opportunities available to them. In a free economy an established business is rarely limited to a single possibility for investment. It has available to it a whole range of investment alternatives, and it will, therefore, invest in that opportunity which seems to it to offer the greatest promise of profit; we doubt that an investment opportunity of the type we have here suggested would be generally attractive to private business.

On the other hand, where the Government reserves a nonexclusive, royalty-free license and permits the individual contractor to take all other patent rights, the company in question has an immediate incentive to make the economic benefits of the new invention promptly available to the general public. This follows because of the probability that competitors will undertake shortly to design around his basic patent or to develop a noninfringing substitute—a probability that is strengthened in direct proportion to the potential profitability of the article in question. Once again the common practice of "designing around" plays an important role in our industrial life and deserves mention in this connection.

Professor Hamberg refers to a patent right as a monopoly power. It is a limited right—limited in time to 17 years and limited in application to the claims of new art allowed in connection with the granting of letters patent. It is by no means a monopoly on the basic information involved or upon the sale or future development of other and competing articles designed to accomplish the same purpose, and its very existence, as we have already observed, is a challenge to the ingenuity of competitors. It is simply and wholly a right to exclude for a limited period others from practicing the invention in question. In sum, we believe a patent right in private hands—whether developed at Government or private expense—is the best system yet devised to insure that economic benefits of new inventions will be promptly made available to the general public—not only because of the incentive for exploitation it holds for the patentee, but because its existence almost inevitably begets further technological progress by the same or competing firms.

Does the Government receive all it pays for when it buys research and development?

The answer to the third of the broad questions posed by the subcommittee is in turn dependent upon the answers to certain other questions. What is the Government buying when it contracts for research and development work? And, what is the Government's proper role, if any, in the commercial exploitation of new inventions developed under research and development contracts?

The products of research and development contracts may range from a prototype of a new weapon, space vehicle, etc., to the exertion on the part of the contractor of his best efforts to add to the sum of human knowledge on some subject of interest to the government. Regardless of the character of the final

[2] See the testimony of Mr. William H. Davis, New York Patent Law Association in hearings before the Subcommittee on Legislation, Joint Committee on Atomic Energy, Apr. 21–23, 1959.

product, it is purchased for Government purposes. It is not purchased with a view to exploitation for profit of any commercially valuable "fallout" which may result from research and development work conducted for purely Government purposes.

The Government may, as we have seen, contract for research and development looking toward creation of a product or process to be used exclusively in the Government service, e.g., national defense. On the other hand, it may contract for research and development to advance the "state of the art" in some field such as agriculture or atomic energy. In cases of this latter type, the Government generally acquires full patent rights to any inventions connected with such research and development work, making available to the public at little or no cost, the results of such work, including the rights to use patented processes for commercial purposes. Such Government-sponsored research deserves special comment.

It has been asserted that this latter policy insures that the public does not pay twice for the results of research and development—once in taxes and again in "monopoly", or at least higher, prices for the patented items. We would not argue that technological advancement will not occur under such a policy—as for example that of the Atomic Energy Commission. We have every hope that it will. But for reasons already detailed at length herein, we do not believe that the benefits of such research will be made available to the general public as quickly, as efficiently or as cheaply as they might be where individual companies are permitted to acquire patent rights. If, as we believe, the pace of technological advance is keyed in large part to the incentives of the patent system, then Government procurement patent policy ought to favor the granting of private patent rights regardless of the immediate purpose of the research and development contract.

It seems to us that if we keep firmly in mind the distinction between purely governmental purposes underlying research and development work and the fortuitous development of commercially valuable inventions the answer to the general question is fairly simple. Insofar as it has received, upon completion of contract performance, the article, the process, or the new knowledge required by the agreement, then it seems to us that the Government has indeed received all that it paid for. We do not believe the Government contracted in the first place with a view to development of inventions which might be exploited for profit, nor do we think it should contract with any such intent.

The committee's release of December 8 clearly implies that the Government should perhaps undertake the recoupment—presumably through licensing arrangements or otherwise—of some part, or perhaps all, of its expenditures on research and development. For reasons already set out herein we think this would be unwise and uneconomic policy in the long run. There is one additional reason, moreover, that applies particularly to this suggestion and with which we should like to deal in some detail.

The fact is that Government now receives, in our opinion—and in the opinion of many firms in defense work—considerably more than it pays for under research and development contracts. Contracts of this type are not awarded in a vacuum or in some completely sterile atmosphere devoid of preexisting knowledge of the art involved. Typically, the Government contracts for a particular type of research and development work with company A rather than company B because company A has a long history of experience and know-how in the field in question and, customarily, that advanced knowledge has been achieved partly if not wholly at private expense. Moreover, company A employs skilled people and possesses facilities especially suited to the Government's needs; the result of contracting with company A is that the Government accomplishes the work it must have done faster and more cheaply than would otherwise be possible.

If the Government now were to adopt the policy of acquiring in every case full patent rights to inventions developed under research and development contracts—and with such inventions representing in most cases a partial product of private investment—it seems to us that the Government would necessarily have to pay more than it now pays to have its research and development work done for it. Private industry would not, we think, be willing to transfer to Government in addition to the immediate product of the research and development contract, all of its background know-how without demanding a substantially increased contract price. In very many cases the contractor would be selling a part of the value of its competitive position and that kind of purchase comes high by any standard of equity and reasonableness.

INSTITUTE RECOMMENDATIONS

In the light of our review of the three broad questions posed by the subcommittee's original announcement of this hearing and in the light of our discussion of those questions above, the institute makes the following specific recommendations:

1. The Government, in a matter of general policy, should limit itself to the acquisition of royalty-free, nonexclusive licenses to inventions first conceived or reduced to practice during the performance of Government research and development contracts.

2. This policy, which has been adopted by the Department of Defense, should be followed by all Federal agencies.

We have one additional comment. It would appear that the subject of government procurement patent policy—and, necessarily, the future of the American patent system—is being considered in piecemeal fashion. Last May the patent policy of the Atomic Energy Commission was considered by the Joint Committee on Atomic Energy. Recently, the patent policy of NASA was the subject of a hearing before a subcommittee of the House Science and Astronautics Committee and now this subcommittee is considering procurement patent policies of all Government agencies from the standpoint of small business.

Faced with explosive new technologies, the Government will almost certainly increase its research and development expenditures in the future, especially in those fields where mastery is essential to national security. From this scientific inquiry we may reasonably expect discoveries of commercial value; indeed we may not unreasonably suppose that basic technologies may emerge which in time will shoulder aside conventional technologies of this day.

Given these possibilities are we not faced with some fundamental questions of national policy? Are the traditional incentives of the American patent system essential to rapid technological advancement in these new fields? Independent of the question of normal patent incentives should the Government become the economic master of its citizens by acquiring basic patent rights in these new fields of scientific and technical discovery? We think the ultimate issues are nothing less than these and their resolution, we submit, requires a comprehensive and unified study of the entire problem.

In concluding our statement on the patent policies of Federal agencies, we should like once again to express our appreciation to the subcommittee for the opportunity of filing this statement of institute views. If we can be of any further assistance to the subcommittee in its consideration of this problem we shall, of course, be pleased to help.

Respectfully,

CHARLES STEWART, *President.*

APPENDIX X

PREPARED STATEMENT OF F. GERALD TOYE, WASHINGTON COUNSEL, GENERAL ELECTRIC CO., WITH ACCOMPANYING EXHIBITS

WASHINGTON, *D.C., January 11, 1960.*

Hon. RUSSELL B. LONG,
Subcommittee on Monopoly of
Select Committee on Small Business,
U.S. Senate,
Washington, D.C.

DEAR SIR: I wish to thank you for the opportunity to place in the record this statement of the General Electric Co. regarding the testimony given before the subcommittee on December 8, 1950, by Mr. Harry Stern,[1] president, Action Manufacturing Co. I have reviewed Mr. Stern's testimony with the cognizant operating department of the company and I find such testimony to be widely at variance with the facts as to this company's policy and practices in the repair and maintenance of aircraft instruments.

Aircraft instruments are complex precision devices used for air navigation and in flight measurement of aircraft performance. Accuracy and reliability of these instruments is critical to the safety of life and property in the air. They

[1] See p. 44 for Mr. Stern's testimony.

require periodic inspection, calibration, maintenance, and overhaul to insure proper performance.

As a manufacturer of these instruments, we must be able to assure our users of the availability of technically competent maintenance service in convenient locations throughout the country. Our factory production facilities are not designed for repair work and we do not solicit repair work for the factory. Instead, we provide this service both through independent service organizations (currently 27 in number) whom we have found to be qualified and through aircraft service shops maintained by this company at Ontario, Calif., Cincinnati, and Dallas. In the interest of customer convenience, we have endeavored to build up a number of qualified independent organizations, and to assist more firms to acquire and maintain the necessary competence we operate an aircraft instrument school for their personnel. There is no charge for attendance at this school; the attendant pays only for transportation and living expenses. Our current list of independent qualified repair and overhaul facilities for General Electric aircraft instruments is attached as exhibit A.

Because of the importance of aircraft instruments to safety of life and property, we do not in general sell special tools and test equipment or replacement parts for General Electric instruments without satisfying ourselves that the purchaser is qualified to use them. However, it is our policy where the Government awards a contract to a facility which has not taken steps to establish its qualified status with our organization to nevertheless supply repair equipment and parts whenever the Government so requests. We do this at our prevailing prices and delivery terms, which are the same as would be available to any servicing facility on the attached list, were it to be awarded the contract.

This arrangement was worked out with the Government in March 1959. Since that date, upon Government request, we have quoted and regularly sold aircraft instrument parts to any Government contractor, including Action Manufacturing Co.

We have examined all quotations to Action Manufacturing Co. in our files for both replacement parts and test equipment, and in each case we quoted the prevailing prices and delivery dates that were likewise available to both independent and company-owned servicing facilities. In one instance we expedited a delivery date at the Government's urgent request, and this has apparently been misconstrued by Mr. Stern as a discrepancy in quoting the original delivery date.

With respect to Mr. Stern's charge of monopoly of the repair and overhaul business, the three aircraft service shops owned by General Electric Co. received approximately $300,000 of aircraft instrument overhaul business for the first 11 months of 1959. While we do not have available the total amount of repair and overhaul business on General Electric aircraft instruments which has been received by all independent servicing facilities, we feel certain that a canvass by the committee would reveal that the great majority of this business is performed by independent organizations.

The statement has been made that technical manuals for overhaul are deliberately or inadvertently made incomplete to assure the performance of the overhaul work in our factory. This company takes considerable pride in the clarity, accuracy, and completeness of its service manuals, and we feel that Mr. Stern's testimony on these points is utterly unwarranted. During the life of any Government production contract awarded to this company for aircraft instruments, we are obligated to prepare overhaul manuals and to make any necessary revisions every 90 days in order to keep them up to date. This company meticulously meets these obligations with full realization of the anticipated use of our service manuals by Armed Forces personnel and their authorized representatives. Further, before acceptance and publication, these manuals are inspected by a qualified representative of the Armed Forces. The listing of parts in such manuals by General Electric part number is done strictly in accordance with military specifications which require identification by vendor part number and, where applicable, any Federal stock numbers are likewise set forth.

We trust that this subcommittee will find the foregoing completely responsive to Mr. Stern's charges.

Sincerely yours,

F. GERALD TOYE,
Washington Counsel.

Exhibits Accompanying Statement of General Electric Co.

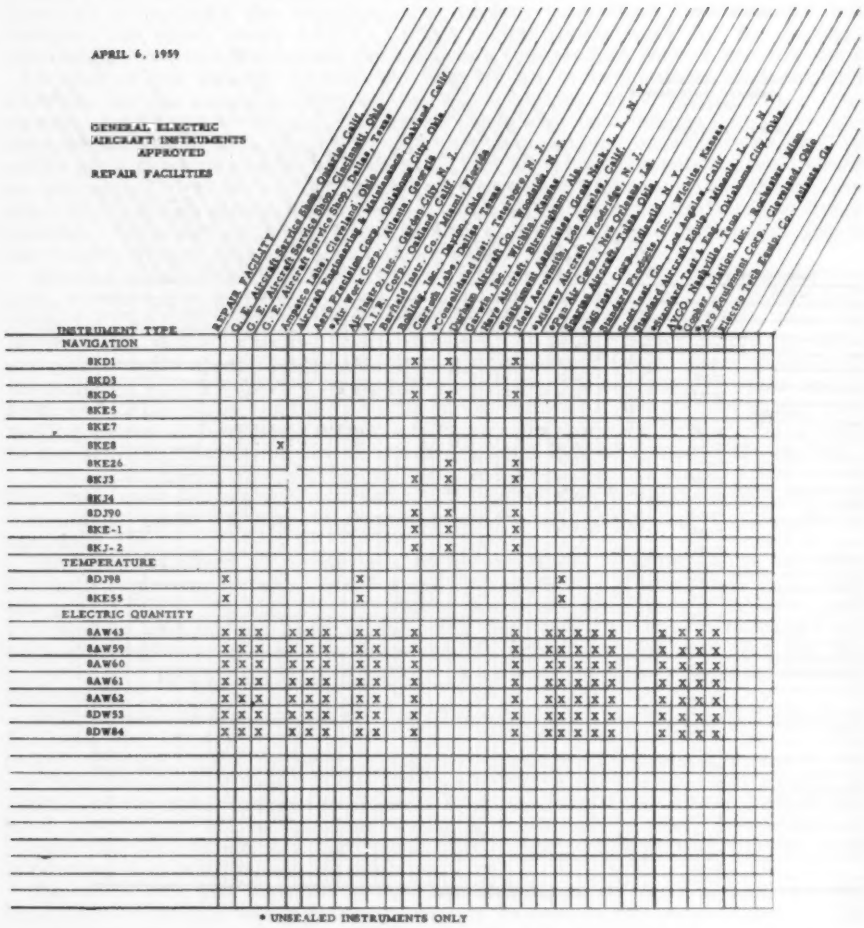
APRIL 6, 1959

GENERAL ELECTRIC
AIRCRAFT INSTRUMENTS
APPROVED

REPAIR FACILITIES

INSTRUMENT TYPE / REPAIR FACILITY	G. E. Aircraft Service Shop, Ontario, Calif.	G. E. Aircraft Service Shop, Cincinnati, Ohio	G. E. Aircraft Service Shop, Dallas, Texas	Ammco Labs., Cleveland, Ohio	Aircraft Engineering & Maintenance, Oakland, Calif.	Aero Precision Corp., Oklahoma City, Okla.	*Air Work Corp., Atlanta Georgia	Air Instro, Inc., Garden City, N. J.	A.L.B. Corp., Oakland, Calif.	Barfield Instr. Co., Miami, Florida	Bobling, Inc., Dayton, Ohio	Carruth Labs, Dallas Texas	*Consolidated Inst., Teterboro, N. J.	Durham Aircraft Co., Woodside, N. J.	Garvis, Inc., Wichita, Kansas	Hays Aircraft, Birmingham, Ala.	*Instrument Associates, Great Neck, L. I., N. Y.	Ideal Aerosmith, Los Angeles, Calif.	*Midway Aircraft, Woodridge, N. J.	*Pan Air Corp., New Orleans, La.	Spartan Aircraft, Tulsa, Okla.	SMS Inst. Corp., Idlewild, N. Y.	Standard Products, Inc., Wichita, Kansas	Scott Inst. Co., Los Angeles, Calif.	Standard Aircraft Equip., Mineola, L. I., N. Y.	*Standard Test & Eng., Oklahoma City, Okla.	AVCO, Nashville, Tenn.	*Goober Aviation Inc., Rochester, Minn.	*Aero Equipment Corp., Cleveland, Ohio	Electro Tech Equip. Co., Atlanta, Ga.			
SPEED																																	
2CM9	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
8DJ19	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
8DJ67	X	X			X	X		X	X	X	X	X		X	X	X		X			X	X	X	X	X		X			X			
8DJ81	X	X			X	X		X	X	X	X	X		X	X	X		X			X	X	X	X	X		X			X			
8DJ82	X	X			X	X		X	X	X	X	X		X	X	X		X			X	X	X	X	X		X			X			
8DJ89	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X			
POSITION																																	
8DJ26	X	X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X							
8DJ48	X	X		X	X	X		X	X	X	X	X		X				X			X	X	X	X	X								
8DJ49	X	X		X	X	X		X	X	X	X	X		X				X			X	X	X	X	X								
8DJ50	X	X		X	X	X		X	X	X	X	X		X				X			X	X	X	X	X								
8DJ54	X	X		X	X	X		X	X	X	X	X		X				X			X	X	X	X	X								
8DJ66	X	X		X	X	X		X	X	X	X	X		X				X			X	X	X	X	X								
8DJ68	X	X		X	X	X		X	X	X	X	X		X				X			X	X	X	X	X								
8DJ91	X	X		X	X	X		X	X	X	X	X		X				X			X	X	X	X	X								
8TJ9	X	X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X							
8TJ19	X	X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X							
8TJ39	X	X		X	X	X		X	X	X	X	X		X				X			X	X	X	X	X								
8TJ55	X	X		X	X	X		X	X	X	X	X		X				X			X	X	X	X	X								
FLOW																																	
8DJ64	X	X								X															X								
8DJ69	X	X								X															X								
8DJ71	X	X								X															X								
8DJ72	X	X								X															X								
8DJ77	X	X								X															X								
8DJ80	X	X								X															X								
8DJ86	X	X								X															X								
8DJ88	X	X								X															X								
8DJ97	X	X								X															X								
8KE25	X	X								X															X								
8TJ50	X	X								X															X								
8TJ51	X	X								X															X								
8TJ53																																	
8TJ54	X	X								X															X								
8TJ59	X	X								X															X								

*Unsealed Instruments Only



APPENDIX XI

LETTER FROM FLOYD H. CREWS, CHAIRMAN, COMMITTEE ON PATENTS, ASSOCIATION OF THE BAR OF THE CITY OF NEW YORK, WITH ACCOMPANYING PREPARED STATEMENT OF WILLIAM H. DAVIS

DARBY & DARBY,
New York, N.Y., December 21, 1959.

Hon. RUSSELL LONG,
Subcommittee on Monopoly, Committee on Small Business,
U.S. Senate, Washington, D.C.

DEAR SENATOR LONG: I enclose a copy of a statement by Mr. William H. Davis, made before the House Subcommittee on Patents of the House Committee on Science and Astronautics during the week of December 1. Mr. Davis was speaking on behalf of the Committee on Patents of the Association of the Bar of the city of New York, and you will note he quotes a resolution of that committee on page 5[1] of his statement.

[1] See p. 440.

Mr. Davis' statement seems to me to be very pertinent to the questions which I understand your Subcommittee on Patents has been considering. I respectfully suggest that this statement be incorporated in the record of the proceedings of your subcommittee.

Respectfully.

FLOYD H. CREWS,
Chairman, Committee on Patents,
Association of the Bar of the City of New York.

STATEMENT OF WILLIAM H. DAVIS, PATENT ATTORNEY, ON BEHALF OF THE COMMITTEE ON PATENTS OF THE ASSOCIATION OF THE BAR OF THE CITY OF NEW YORK,[1] MADE BEFORE THE HOUSE SUBCOMMITTEE ON PATENTS, COMMITTEE ON SCIENCE AND ASTRONAUTICS, DECEMBER 1, 1959

I have read with interest and with a great deal of satisfaction the proposed substitute section 305 of the act. It seems to me to be a long step in the right direction. I have at this time only one remark to make about it. It invests the Administrator with a great deal of discretion and responsibility. It seems to me that it would be a wise move if the Congress should give the Administrator some guide to the exercise of his discretion in the form of an appropriate declaration of policy to be incorporated in the amended act. I have been bold enough, merely by way of suggestion, to draft what I would regard as a generally appropriate declaration of such policy. I will return to that suggestion at the end of my remarks.

If I can add anything of value to the discussion it will be by underscoring and emphasizing that the Administration has to deal with two aspects of inventions (1) the invention itself; i.e., the technological advance that has been achieved and (2) the monopoly, limited in duration, that has been created under the constitutional provision (art. 1, § 8) to promote the progress of useful arts.

It takes little consideration to realize that the interests of the United States will be protected and advanced by quite different procedures in dealing with these two aspects.

As to the technological advance, those interests of the United States which depend upon the availability for use by the Government and its contractors of the technological improvement are amply taken care of by "an irrevocable, nonexclusive, nontransferable, royalty-free license for the practice of such invention throughout the world by or on behalf of the United States or any foreign government pursuant to any treaty or agreement with the United States" (305(f)).

But the situation is quite different as to the monopoly, limited in duration—the right to exclude—granted to the inventor or his assignee by the Government under the patent law. This difference is implicitly recognized and pretty well expressed in the new "policy" paragraph 1245.103 of the rules and regulations of NASA.

"(a) the stimulus of private ownership of patent rights will encourage the development of the invention to the point of practical application earlier than would otherwise be the case, or (b) there are substantial equities justifying the retention of private rights in the invention."

This right to exclude left in the hands of the United States is of no use to anyone because it becomes in fact available to everyone. It no longer retains the incentive value of a patent in competitive private ownership. The United States never has undertaken to exclude and I am convinced that it never will undertake to exclude any citizen of the United States from the use of a Government-owned patent monopoly. There are obvious reasons why this has been so.

During the First World War our Government came into possession of patent rights in many valuable inventions, particularly in the chemical industry; most of them in the hands of the Alien Property Custodian. There was a great deal of discussion about exploiting these rights in this country. The need to preserve the incentive, to protect the risked investment of money, time, and skill by a pioneering exploiter, was well understood, and it was recognized that this would involve the discriminatory granting of licenses to favored persons or corporations in important fields of industry. It was seen that the enforcement of the right to exclude on which the licensee or licensees would rely for re-

[1] Mr. Davis is past president of the New York Patent Law Association.

coupment of their investments would entail the setting up—presumably in the Department of Justice—of a patent litigating section to enforce the monopoly by suits in the Federal courts against less favored citizens who might challenge the validity of the patent monopoly or the propriety of the discrimination. The Wilson administration decided, on what I think was very good advice, to keep out of any such mess.

Because the development of atomic energy has been primarily a Government-financed enterprise, the United States since 1946 has become the owner of extensive patent rights in that field. The Atomic Energy Commission has granted nonexclusive licenses to all comers without royalty, but it has never granted exclusive licenses to favored persons or corporations, and I am quite sure that it never will.

Thus, the vesting of the right to exclude in the U.S. Government does not advance—it sets back—the interests of the United States, defeating the purpose of article 1, section 8, of our Constitution, by emasculating the incentive of the patent law to encourage "the development of the invention to the point of practical application earlier than would otherwise be the case" and effectively ignoring the "substantial equities justifying the retention of private rights in the invention" (NASA rules and regulations, sec. 1545.103).

What I am saying is that rational consideration of the interests of the United States must recognize (*a*) that monopoly rights in patents for inventions cannot usefully be vested in the Government; (*b*) that the Congress should eschew the vesting in the United States of such monopoly rights; and (*c*) that Congress should leave the monopoly rights in private ownership where they stimulate invention and development of technological innovation.

I am not unaware that looking at the matter from the point of view I have stated leads to the same conclusion that has been pressed upon this committee by others—a complete condemnation of section 305 of the National Aeronautics and Space Act of 1958. Indeed, as a spokesman before your committee for the Committee on Patents of the Association of the Bar of the City of New York, I am directed to call the attention of this committee to the following resolution adopted by the Committee on Patents and transmitted to the General Counsel of the NASA:

"*Resolved*, That the interests of the United States would be best served if the contractor would retain title to all inventions made under the National Aeronautics and Space Act of 1958 and the Administrator retain for the Government only a nonexclusive, royalty-free license."

I think this conclusion is implicit in the fact that we cannot shut our eyes to what would be the practical consequence of replacing the vesting of exclusive rights in the United States called for in section 305 by the vesting of that right in the inventors or their assignees, the contractors.

It is only too clear that vesting this monopoly in the United States lays a dead hand upon the incentive to progress in the useful arts for which our Constitution intended it. The procedure is, I suggest, like that of the wicked and slothful servant who went and hid his talent in the earth; whereas vesting the right to exclude is that of the good and faithful servant who receiving the five talents "went and traded with the same." Or should I say that section 305 as it now stands is best compared to the dog in the manger who slept on the hay and kept the cows from eating it?

I only wish that I could give to this committee a concrete picture of what the now recommended disposition of the patent monopoly could, if we are to judge by experience, amount to in aeronautics and the exploration of space. To what extent retention of the patent monopoly by the United States under section 305 is an impediment to getting contractors to take on these Government contracts involving research and invention in aeronautics and the exploration of space is a question as to which I have no specific, concrete knowledge or experience. It is certain; however, that the arrangement of section 305 is no enticement to a contractor; whereas the substitute provision now proposed would be a very real enticement. Indeed we would be justified in hoping that it might give rise to competition among contractors to the obvious advantage of the interests of the United States. But beyond the contractors let us take a look at the individuals; because it is individuals not contracting corporations that make inventions. So long as the individual employee knows that his employer can reap no advantage from patent rights he can hardly expect that the employer will extend to him any special compensation for his invention. It is, of course, the common and perhaps necessary practice that the employees in such work

should be under contract to assign their inventions to the employer, but it would be a great mistake to suppose that because of this the employees who are inventors are not rewarded either in money compensation or in status. I believe that any experienced director of research or any experienced patent lawyer could cite many instances in which an employee under contract to assign his inventions to his employer nevertheless has been able, having made a significant invention, to improve—even to revolutionize—his status in the organization. The interests of the United States require, I respectfully submit, that this incentive to the development of advanced technology in the exploration of space should be jealously guarded and effectively used.

CONCLUSION

The interests of the United States in patentable inventions made in the carrying out of Government contracts related to space activities require—

1. That the free right to use the invetions (i.e., the technological improvements) for governmental purposes be vested in the Administration.
2. That the monopoly right to exclude others from the use of the inventions be vested in the inventors or the contractors.

SUGGESTED DECLARATION OF POLICY

Recognizing that the monopoly right to exclude others from the use of an invention for a limited term granted under our patent law is a right that has never heretofore been exercised by the United States to authorize the use of the invention by a particular individual or corporation to the exclusion of other citizens and that it is not a right apt to be used in that way, and further recognizing that this monopoly right to exclude is in private ownership apt to promote the progress of a useful art and specifically of aeronautical and space activities and to encourage the development of the invention to the point of practical application earlier than would otherwise be the case, and that there are substantial equities justifying the retention of this private right in the invention by inventor or his assignee; it is the policy of this act to vest that monopoly right to exclude in the inventor or his assignee subject only to such conditions as, in a particular case, may clearly and peculiarly require that the monopoly right to exclude, or some part of it, be retained by the United States.

APPENDIX XII

STATEMENT OF FLOYD H. CREWS AS A REPRESENTATIVE OF THE NEW YORK PATENT LAW ASSOCIATION MADE BEFORE THE SUBCOMMITTEE ON PATENTS, HOUSE SCIENCE AND ASTRONAUTICS COMMITTEE, DECEMBER 2, 1959

My name is Floyd H. Crews. I live at 19 Montrose Road, Scarsdale, N.Y. I am a patent lawyer, and am a member of the firm of Darby & Darby, with offices in the Chrysler Building, New York City. I am appearing here today as a representative of the New York Patent Law Association, an organization with more than 1,000 members. I am a past president of the association.

The board of governors of the New York Patent Law Association has adopted the following resolution:

"*Resolved*, That the board of governors of the New York Patent Law Association approves the resolution of the house of delegates of the American Bar Association adopted during its February 22–24, 1959 meeting."

The resolution of the house of delegates of the American Bar Association which was thus approved reads as follows:

"*Resolved*, That the American Bar Association approves the retention by a contractor of full title to all patent rights arising out of research or developing contracts sponsored primarily for governmental use by any Government department, agency or the like, subject only to a royalty-free, nonexclusive license to the Government for governmental purposes, but not to enable the Government to furnish services and supplies to the public in competition with a contractor and its licensees; and be it further

"*Resolved*, That the American Bar Association specifically disapproves those provisions of the national aeronautics and space law of 1958 relating to such patent rights."

The remainder of my remarks has not been approved by the board of governors, but is my own explanation of why I approve and support the resolution I just read.

I should like to discuss what the effects upon aeronautics and space technology would be if section 305 contained no waiver provision. I believe such an approach will throw light on the fundamental question of what policy should underlie any amendment of section 305.

The patent system accomplishes at least five positive and important things in promoting the progress of the useful arts:

1. It stimulates invention;
2. It promotes disclosure—avoids secrecy;
3. It encourages venture capital to take large risks in new and untried fields of technology;
4. It stimulates further competition in invention;
5. It makes inventions freely available to the public after the expiration of the patents.

If section 305 contained no waiver provision these benefits would be almost completely lost. I will discuss each of them.

1. It stimulates invention

We like to think of ourselves as an inventive nation. Perhaps we are, since degree of inventiveness is purely a relative matter. But it should not be forgotten that we are turning out new inventions at the rate of approximately one invention per person for each 6,000 years—hardly a rate to cause excitement.

We are a great industrial nation. We are said to have vast national resources. But we have important natural resources only to extent we have developed and expanded our meager store by invention. Water power, for example, is a nuisance rather than an asset except for electricity. The American Indian had all the natural resources we have today, but he never used them or knew they existed. Our greatest natural resource has been our inventiveness.

We have become a great industrial nation by inventing at the rate of one invention per person for each 6,000 years. Instead of a flood of invention we have had a trickle. We do not dare turn the trickle down.

That section 305 without the waiver provision would turn the trickle down has, in my mind, been demonstrated convincingly by Mr. Robert A. Solo in his Study No. 18 for the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary of the U.S. Senate (the so-called O'Mahoney subcommittee), issued earlier this year. I suggest that that study deserves the most careful consideration.

2. It promotes disclosure—avoids secrecy

So far as I know no one has ever questioned the value and importance of the patent system in this area. We have in the Patent Office nearly 3 million patents, covering in detail every ramification of every subject in the physical sciences to which the mind of man has been applied. And all of these patents are classified and subclassified by subject matter. The U.S. Patent Office has become the greatest storehouse of usable technical information ever seen in the world. It excels the greatest library in the world, and probably all of them put together, so far as technology is concerned. We can all be very proud of the service done by the patent system and the Patent Office in disseminating scientific knowledge.

The greatest harm that could be done to American technology—and I think that means to the country itself—would be to create conditions under which inventions would be kept secret.

Actually, it is difficult to give a technical secret away. It must be given away to the right person, at the right place, at the right time. But what we are striving to do, and what the patent system has accomplished admirably, is to give secrets away under usable conditions. Only by giving secrets away under usable conditions can technology advance. Only in that way can we be released from the slow advance of one independent, isolated, unknown invention per person for each 6,000 years. Only in that way can we build on the past.

Without the waiver provision of section 305 there would inevitably be secrecy rather than open disclosure. This, again, is demonstrated by Mr. Solo's study.

3. It encourages venture capital to take large risks in new and untried fields of technology

Without the waiver provision, section 305 would in effect wipe out private patents in aeronautics and space, as most of those directly interested would have some sort of Government contracts.

A patent provides protection for 17 years and then is gone. Section 305 would wipe out the 17 years and make it available immediately. Offhand this would seem to be a tremendous advance—an advance of 17 years multiplied by the number of inventions.

What we have to remember is that it is not the number of inventions that are made, but the number that get into use that is important. Today's Patent Office could have been set down complete in Washington or Plymouth Rock in 1620 without effecting any change in the economy.

We have only to remember the history of invention to realize how important patents have been to technological advance through their contribution to risky enterprise. The steamboat, locomotive, cotton gin, revolver, barbed wire, typewriter, linotype, telegraph, telephone, bicycle, electric light, electric motor, internal combustion engine, air brakes, macadam roads, talking machine, airplane, moving pictures, washing machine, radio, nylon, synthetic rubber, television, coaxial cable, helicopter, penicillin, plastics, transistor electronic computer, video tape, and color TV—not to overlook the Boeing 707, the Douglas DC–8 and whatever planes will follow—are a few familiar examples.

More than $100 million has been spent on color TV with no return so far. It would not have been spent without the reasonable hope of profit. Without patents there would be little hope of a return which could justify such a gigantic risk. And this is a typical case except for the amount involved.

It is not the expiration of patents that gets new inventions into use. It is the temporary right to exclude that encourages risk in new and untried fields. They get into use more widely after the patent expires because they have been developed and perfected under patent protection.

4. It stimulates further competition in invention

This is perhaps the least understood of the important functions performed by the patent system. A patent conveys exclusive rights only in the specific mechanism by which a useful result is accomplished—or in a specific product or process. A patent on nylon does not grant any rights to exclude orlon or dacron. A patent on an airplane grants no right to exclude a helicopter.

Improvement is always possible. There is always a better process, a better machine, a better product. The transistor replaced the radio tube which replaced the alternator. For some purposes the helicopter replaced the airplane, which replaced the automobile, which replaced the horse.

If patents are abolished, which is the same thing as patents being assigned to the Government, there is no need for counterinvention, and no incentive.

The subject of competitive invention has been discussed thoroughly by Mr. George E. Frost in his Study No. 2 for the O'Mahoney subcommittee entitled "The Patent System and the Modern Economy." His study deserves careful consideration.

5. It makes inventions freely available to the public after expiration of patent

It is not enough that inventions be made or patents granted. They must be brought into use. If Morse had simply invented and patented the telegraph, or Bell the telephone, or de Forest the oscillator, without more, there would be no real advance. When a new product has been established, or a new industry built, under patent protection, the stage of special risk is passed. With the expiration of the patent anyone willing to take ordinary business risks may enter the field.

Without the waiver provision there would be no patent protection for special risks and the new product or new industry would not get developed. There would therefore be no new technology developed which would be available to the public on the expiration of the patent.

THE WAIVER PROVISION

I have been discussing section 305 as though it contained no waiver provision. Of course it does contain such a provision.

Waiver is mentioned in section 305(a) as an exception to the basic policy there stated, and section 305(f) prescribes the condition that there may be such waiver if "the interests of the United States will be served thereby."

The Administrator and his legal staff have done an excellent job of serving the interests of the United States in administering section 305. They have recognized and understood the vital role played by patents in private hands in advancing technology. But it could have been otherwise. The act left it with the Administrator to determine what policy would best protect the in-

terests of the United States. The act made it possible for an uninformed Administrator to have made the act into a piece of monumental legislative folly. And with a change in Administrators that could still occur, without any change in the act itself.

My point is that Congress should itself make policy, and not permit policy to be made and changed at the whim of some chance Administrator. The fact that we have been lucky so far in the administration of the act does not make this good legislation, or insure continued luck.

This country has grown great economically and militarily through inventions backed by venture capital. That has been possible only through the patent system which has encouraged the making and promotion of new inventions at great cost and risk. It should be established as the unalterable policy of Congress that aeronautics and space should have the full benefit of private patents in private hands. That has been proved to be the path of greatest progress at least expense. Only in that manner will the minds and pocketbooks of men be freed and encouraged to new adventure in prying open the doors of progress.

I cannot close without saying a word about section 305(h). That is the section that authorizes the Administrator to take all suitable and necessary steps "to protect any invention or discovery to which he has title" and to require that contractors or persons who retain title to inventions or discoveries under this section "protect the inventions or discoveries" to which the administration has or may acquire a license of use.

This language is meaningless. I do not know, and I am sure no one else knows, what it means to "protect" an invention. One could speculate at length on what this language meant to the anonymous author. There are a great many possible meanings.

This entire section 305 was added at the last moment on the floor without public hearing. The entire section in general, and section 305(h) in particular, is an example of the uncertainties and dangers involved in such impromptu legislation.

APPENDIX XIII

LETTER FROM J. BJORKSTEN, PRESIDENT, BJORKSTEN RESEARCH LABORATORIES FOR INDUSTRY, INC., HOUSTON, TEX.

DECEMBER 30, 1959.

Hon. RUSSELL LONG,
Chairman, Monopoly Subcommittee,
U.S. Senate, Washington, D.C.

DEAR SENATOR LONG: * * * As president of a small organization (just less than 100 persons), which over the years has devoted about one-half of its manpower to defense research, I feel impelled to make a few comments.

Only a very small percentage of defense patents will pay off, but all cost money to prosecute. We have over the last 15 years filed about 200 patents and patent applications, and the income we have had from defense-derived patents to date is still less than our cost for obtaining the patents.

It seems to be assumed that when the Government allows a 6 to 7 percent profit on cost-plus-fixed-fee contracts, this should be adequate. However, this 6 to 7 percent profit in actual practice is reduced to almost nothing by:

(1) The fact that the Government often takes a very long time in paying for the research done and does not compensate for interest charges. We have had to wait for payments for a year or more while reports were being passed around from desk to desk for final approval, or returned to us for purely formal changes before we even could invoice.

(2) When a merchant is allowed 6 or 7 percent profit on an item the deal may be consummated in a matter of a few weeks or months and he can then make another 6 or 7 percent on another deal so that he makes that profit several times in a year. On research contracts, however, the profits are figured on a yearly basis so that a small firm selling research to the Government is in the position of the merchant who can turn over his goods only once a year.

(3) Deductions on technicalities of various kinds further whittle down the theoretically allowed 6–7 percent profit, often to the vanishing point. To be specific, last year on a research volume between $300,000 and $400,000 worth of Government contracts, our net profit was between $10,000 and $15,000. I believe that our experience is representative of that of the majority of small organizations doing research business for the Government.

Under such circumstances the only fact that justifies our doing business for the Government, on research, aside from a desire to be of help, is the rather remote possibility of obtaining a profitable patent situation. If the Government were to retain all the patent rights on defense contracts we could no longer justify bidding for any Government defense work.

Therefore, if a ruling should be passed for Government ownership of all patents deriving from defense research, it would be necessary to greatly liberalize the terms in other regards to small business on such contracts so that these would substantially match the terms offered by private industry on contract research where patent rights go to the sponsor, which are a 15 percent per annum fee with a minimum of bookkeeping, prompt payment, and right to invoice promptly.

In order to give substance to these comments I am taking the liberty of enclosing a couple of bulletins showing research in which we have been engaged and which we are free to make public.

Very respectfully yours,

BJORKSTEN RESEARCH LABORATORIES, INC.,
J. BJORKSTEN, *President*.

APPENDIX XIV

STATEMENT BY AMERICAN BAR ASSOCIATION TO THE SUBCOMMITTEE ON MONOPOLY OF THE SENATE SMALL BUSINESS COMMITTEE

This statement is submitted by the American Bar Association in order to make known to this subcommittee the association's views with respect to patent rights arising out of Government-sponsored research and development contracts.

The position of the American Bar Association with respect to this subject is set forth in the following resolution adopted by the house of delegates of the American Bar Association during February 1959:

"*Resolved*, That the American Bar Association approves the retention by a contractor of full title to all patent rights arising out of research or development contracts sponsored primarily for governmental use by any governmental department, agency, or the like, subject only to a royalty free, nonexclusive license to the Government for governmental purposes, but not to enable the Government to furnish services and supplies to the public in competition with a contractor and its licensees."

Reasons supporting the position of the American Bar Association, and more specifically, the application of this principle to small business, include the following:

1. Particular benefit to small business which, in many cases, depends upon adequate patent protection to be able to compete effectively with larger enterprises.

2. Incentive to the best-qualified small business contractors to become more interested in doing governmental research and development, thereby better insuring to the Government research and development work of the highest quality.

3. Assuring the Government all the rights it needs for its purposes, including that of reaching multiple supply sources represented by small business, while enabling the Government to avoid a number of problems, such as filing and prosecuting patent applications, consideration of the nature of licenses granted, etc.

4. Probability of ultimate decrease in cost of Government research and development work.

The principle expressed in the resolution set forth above is in accord with our constitutional policy of securing to inventors the exclusive right (title) to their inventions and discoveries for a limited period of time. It is in accord with the consensus of opinion of practitioners of patent law that commercial exploitation of inventions is best encouraged by such a policy. It is also in accord with the practice of a number of Government departments, including the Department of Defense, of permitting the contractor to retain title to patents on inventions made in the performance of research and development contracts, subject to a nonexclusive royalty-free, irrevocable license to the Government for governmental purposes.

This subcommittee is interested in ways and means for aiding small business. It is believed that the incentives furnished by the patent system do aid and encourage small business. Indeed, as long as the Government obtains license

rights for governmental purposes so that Government needs can be satisfied, with small business participating in Government procurement contracts, any policy which would tend to stifle the incentive of small business to exploit inventions commercially for nongovernmental purposes appears to be contrary to the objectives of this subcommittee.

It is submitted, therefore, that the position of the American Bar Association as set forth in the resolution above is the position which should be adopted by this subcommittee insofar as small business is concerned.

ANDREW B. BEVERIDGE,
Chairman, Committee No. 601—Legislation, Section of Patent, Trademark and Copyright Law, American Bar Association.

APPENDIX XV

PATENT POLICIES OF LARGE PRIME CONTRACTORS

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE,
SUPPLY AND LOGISTICS,
Washington, D.C., January 15, 1960.

SENATE SMALL BUSINESS COMMITTEE.

GENTLEMEN: In regard to Senator Long's inquiry at pages 561 and 562[1] pertaining to the patent policies of the 20 largest prime contractors, I enclose the original letters[2] received from the following:

The Martin Co.
Chrysler Corp.
Republic Aviation Corp.
United Aircraft Corp.
Westinghouse Electric Corp.
Boeing Airplane Co.
International Business Machines Corp.
McDonnell Aircraft Corp.

When we receive replies from the following contractors we will furnish them, and this will complete the requirement:

Sperry Rand Corp.
General Dynamics.
North American Aviation, Inc.
General Electric Co.
Lockheed Aircraft Corp.
Douglas Aircraft Co.
Hughes Aircraft Co.
American Telephone & Telegraph Co.
Raytheon Manufacturing Co.
Grumman Aircraft Engineering Corp.
Bendix Aviation Corp.
General Motors Corp.

Sincerely yours,

G. C. BANNERMAN,
Director for Procurement Policy.

Enclosures: Letters from contractors.

BOEING AIRPLANE CO.,
Seattle, Wash., January 7, 1960.

Mr. PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense,
Washington, D.C.

DEAR MR. LEBOUTILLIER: This will acknowledge your inquiry of December 22, 1959, concerning our practice in acquiring rights in inventions made by our subcontractors in the course of research, developmental, or experimental subcontracts.

Boeing Airplane Co., does not acquire either license rights in, or title to, inventions made by its subcontractors under Defense Department prime contracts.

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[1] See p. 296.
[2] See app. XV(A), p. 453, for copy of letter addressed to these contractors by Defense Department.

With minor exceptions, the same is true in the case of other (non-Defense Department) contracts. The principal exception was an arrangement we had with one company in the course of our commercial thrust-reverser-sound-suppressor research; under that contract each party received certain license rights in inventions made by the other.

We do acquire title to inventions made by consultants, or by employees of another company under what we call technical assistance or technical services agreemnts, which agreements are closely analogous to consulting agreements, if the agreements are Boeing funded (i.e., not under a Government prime contract).

Our practice, which is more liberal than that of the Government, is based upon the beliefs that a master-servant relationship does not exist between Boeing and its subcontractors, and that leaving the patent rights with the originator is an incentive to him to accept the job and do his best.

Very truly yours,

WILLIAM M. ALLEN, *President.*

CHRYSLER CORP.,
Detroit, Mich., January 4, 1960.

Mr. PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense, Supply and Logistics,
Washington, D.C.

DEAR MR. LEBOUTILLIER: Mr. Colbert has received your letter of December 22, 1959, read it, and referred it to me for answer. We are glad to give you the information you desire.

You ask for our policy on four items which we enumerate below, together with our answers.

1. Question. Acquiring title to subcontractors' inventions under defense contracts.

Answer. Should we have a contract with the Government requiring us to obtain title to inventions made by our manufacturing subcontractors, we will use our best efforts to obtain title. To date, however, none of our contracts have so obligated us except for the broad provision in certain space contracts to comply with the provisions of the Space Act.

2. Question. Acquiring license to such inventions.

Answer. Some of our Government contracts require us to attempt to obtain free licenses from subcontractors for the benefit of the Government and in those instances we use our best efforts to obtain such licenses.

3. Question. Acquiring title to contractors' inventions under your own contracts.

Answer. When we make research and development nondefense contracts with manufacturing contractors it is not our policy to require conveyance to us of title to inventions made in the performance of the contracts. If we make such contracts with individuals (as distinguished from manufacturing concerns) we are likely to ask for title and we pay a fee to justify that course.

4. Question. Acquiring license to such inventions.

Answer. When we make nondefense research and development contracts it is our policy to require conveyance to us of a nonexclusive free license to practice inventions made in the performance of the contracts.

If there is any further information we can give you on this subject, please do not hesitate to ask us for it.

Yours very truly,

J. KING HARNESS.

INTERNATIONAL BUSINESS MACHINES CORP.,
New York, N.Y., January 7, 1960.

Mr. PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense, Supply and Logistics,
Department of Defense, Washington, D.C.

DEAR MR. LEBOUTILLIER: IBM is pleased to cooperate with the Department of Defense by furnishing the information requested in your letter of December 22, 1959, to Mr. Watson.

Information provided in the following numbered paragraphs corresponds to similarly numbered categories set forth in your letter.

1. IBM's policy is to not acquire title to research and development subcontractors' inventions under defense contracts.

2. IBM's policy is not to acquire a license to research and development subcontractors' inventions under defense contracts, except under special circumstances; e.g., where IBM has furnished a design upon which the subcontractor's study or development is based. This is a rare occurrence.

3. Where IBM places a commercial contract for research and development work with another company, it is our usual practice to specify that the contractor has the first right to file both domestic and foreign patent applications on his inventions. When the contractor fails to file any patent application in any country on an invention, IBM will receive title to the inventions made by the contractor.

Where the contractor is an established research or engineering organization which customarily assigns title to the sponsoring organization, we also receive title.

Further, we receive title when the contract calls for joint development and IBM provides a significant amount of technical information, advice, counsel, or other assistance.

In each of the above situations when IBM receives title, the contractor is given a worldwide, nonexclusive, royalty-free license with the right to sublicense others without limitation.

Where the work of the contractor is likely to result in a design patent, IBM receives title to protect the distinctive design of its equipment.

4. Where IBM places a commercial contract for research and development work with another company, it is our usual practice to specify that the contractor has the first right to file both domestic and foreign patent applications on his inventions. If he files in one or more countries, IBM may request similar filing, at IBM's expense, in additional countries. Under the above situations, the contractor grants IBM a worldwide, nonexclusive, royalty-free license, with the right to sublicense IBM subsidiaries.

It is hoped that the above information will be sufficient for your response to the subcommittee. Should you have any questions regarding this information, please let me know.

Very truly yours,

J. W. BIRKENSTOCK, *vice president.*

THE MARTIN CO.,
Baltimore, Md., December 31, 1959.

Mr. PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense,
Department of Defense,
Washington, D.C.

DEAR MR. LEBOUTILLIER: Your letter of December 22, 1959, requested information with respect to the policy of the Martin Co. in the matter of obtaining rights in inventions made or first reduced to practice by subcontractors when the prime contract is a Defense Department contract for research and development or for experimentation and contains a standard patents clause (ASPR 9–107.2). It is understood that you require this information for use in responding to certain inquiries made by the Subcommittee on Monopoly of the Select Committee on Small Business, U.S. Senate.

In the fields of research and development and experimentation for the Department of Defense, the Martin Co. performs generally under cost-type contracts. In subcontracting under such contracts, a general company subcontract patent clause is used under which the subcontractor agrees to grant to the Government an irrevocable, nonexclusive, nontransferable, royalty-free license to practice subject inventions conceived or first actually reduced to practice under the subcontract. The Martin Co. receives neither title to nor a license to use such subject inventions. Title remains in the subcontractor. We believe this policy to be consistent with the general philosophy that subcontractors should have commercial rights in their inventions, improvements, and discoveries.

On the other hand, when the Martin Co.'s own funds are involved, title to inventions conceived or reduced to practice by subcontractors vests in the company. The same is true with respect to consultants.

We trust that the foregoing will assist you in preparing a reply to the subcommittee. Should you or the subcommittee require any additional information, we shall be happy to furnish it.

Very truly yours,

W. B. BERGEN.

McDONNELL AIRCRAFT CORP.,
St. Louis, Mo., January 7, 1960.

(Attention: Philip LeBoutillier, Jr., Deputy Assistant Secretary of Defense.)
Subject: Patent clauses used with subcontractors.
Reference: (*a*) Letter dated December 22, 1959, from Philip LeBoutillier, Jr., Deputy Assistant Secretary of Defense (Supply and Logistics), Washington, D.C.

ASSISTANT SECRETARY OF DEFENSE,
Washington, D.C.

DEAR SIR: 1. In response to your request for information on the subject contained in reference (*a*), the following procedure is used by McDonnell Aircraft Corp. (M.A.C.) for all subcontracts to suppliers for experimental, research and development work.

2. For all types of R. & D. prime contracts, whether the "cost plus fixed fee" type or the "incentive fixed price" type is used for the subcontract, M.A.C. includes in the subcontract a form which automatically incorporates all Armed Services Procurement Regulations (ASPR) which are in M.A.C.'s price contract.

3. This contractor attempts to obtain from subcontractors, under R. & D. work, the incentive-fixed-price type of subcontract and has been successful in a very high percentage of negotiations. This type of subcontract gives M.A.C. more precise control of the expenditures under our prime contract. In this case we simply use the ASPR clauses, as a royalty-free, nonexclusive, and nontransferable license on all inventions automatically accrues to the Government.

4. In more complicated subcontracts which would call for considerable research, development, and experimentation, M. A. C. submits to the subcontractor an additional form which has the following patent-rights clause in it:

PATENT RIGHTS

(*a*) Seller hereby assigns to M.A.C. all patent, design, and reproduction rights under all inventions, improvements, and developments which were first conceived or reduced to practice in connection with the work hereunder, subject to any rights which the Government may have.

(*b*) For all designs, inventions, and development incorporated in the work, M.A.C. is hereby granted a nonexclusive royalty-free license or sublicense by seller under all licenses, patents, and patent applications which seller now owns or may acquire. Under such license or sublicenses, M.A.C. may produce or have produced, for sale or use throughout the world, said designs, inventions, developments, improvements, or devices, and improved forms thereof developed by M.A.C.

In many instances paragraph (b) would not be applicable, and therefore it is either deleted entirely or the following clause is substituted in lieu thereof:

(*b*) (alternate) Seller agrees to grant and does hereby grant to M.A.C. any necessary license or right to incorporate in aircraft of similar basic design seller's background patents, design, and proprietary rights on mutually agreeable and reasonable royalties, terms, and conditions, such terms and conditions being at all times no less favorable than granted by seller to any other licensee.

Further, when the circumstances warrant, the words "U.S. Government" are substituted for "M.A.C." in paragraph (*a*).

5. One form or the other of the above clauses, or the variations thereof noted, are sought to be included in our subcontracts only to enable M.A.C. to discharge all of its responsibilities as a prime weapons system contractor of the Government, and to assure delivery of the weapons on schedule in spite of difficulties which might arise at supplier's plant. In all cases our reason for selecting one or another type of clause is explained to the subcontractor and most of them have come to accept the intent and wording used for the particular case involved. Our purchasing and legal departments do not know of any cases where M.A.C.

has had to apply these clauses to obtain adequate performance by the subcontractors. We have no knowledge of any licenses or patent assignments made to M.A.C. thereunder.

6. Very little of our work is performed under other than Government contracts; however, the same wording is usually used under nondefense contracts for this type of work.

Very truly yours,

THOMAS G. RUTLEDGE, *Secretary.*

REPUBLIC AVIATION CORP.,
Farmingdale, Long Island, N.Y., January 4, 1960.

Mr. PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense (Supply and Logistics), Department of Defense, Washington, D.C.

DEAR MR. LEBOUTILLIER: In response to your letter of December 22, the following sets forth the patent policies of Republic Aviation Corp. under research, developmental, or experimental contracts:

Under defense contracts calling for research, developmental, or experimental work, and where payment is made for such work in subcontracts issued thereunder, it is Republic's policy not to acquire title to subcontractors' inventions, but to obtain licenses for the Government as required by ASPR 9–107.2. Republic also requires an irrevocable, royalty-free license under such subcontractors' inventions, but withdraws this requirement upon request.

Under Republic contracts calling for research, developmental, or experimental work, it is Republic's policy not to acquire title to contractors' inventions, but merely an irrevocable, royalty-free license.

We hope this information will be helpful in your considerations.

Sincerely yours,

MUNDY I. PEALE.

UNITED AIRCRAFT CORP.
East Hartford, Conn., January 6, 1960.

Subject: Coorporate policy regarding subcontractors' inventions.

Hon. PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense (Supply and Logistics), The Pentagon, Washington, D.C.

DEAR MR. LEBOUTILLIER: This is in reply to your letter of December 22, 1959, inquiring about the policy of this corporation with respect to the acquisition of titles or licenses to subcontractors' inventions under Government contracts and non-Government contracts calling for research, development, or experimentation. It has been our consistent policy over the years not to acquire for ourselves titles or licenses to the inventions of subcontractors, and this is so whether the supplier is working as a subcontractor under a Government prime contract or as a direct contractor on a non-Government project. Where required to do so by the terms of a Government prime contract, we do require subcontractors to convey to the Government the license rights in their subject inventions in accordance with the provisions of ASPR 9–107.2, but in such instances we do not acquire from the subcontractor any additional rights on our own behalf.

Accordingly, our answers to your four specific questions are as follows:

1. It is the policy of the corporation not to acquire title to subcontractors' inventions under research, developmental, or experimental defense contracts.

2. It is the policy of the corporation not to acquire licenses to such inventions.

3. It is the policy of the corporation not to acquire title to contractors' inventions under our own nondefense contracts.

4. It is the policy of the corporation not to acquire licenses to such inventions.

The foregoing assumes that agreements with consultants, universities, and other research organizations not having production facilities are not the kind of contracts to which your inquiry refers and are not within the ambit of the Senate subcommittee's inquiry. However, if they are, we should note that where we enter into contracts for our own account with such consultants, universities, or research organizations not having production facilities, we generally

require that either title or a license to inventions made in the course of the research work be conveyed to the corporation.

Sincerely,

W. P. GWINN, *President.*

WESTINGHOUSE ELECTRIC CORP.,
Pittsburgh, Pa., January 7, 1960.

Mr. PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense
(Supply and Logistics),
Washington, D.C.

DEAR MR. LEBOUTILLIER: Your letter of December 22 to our president, Mr. Mark W. Cresap, Jr., requesting information relative to our policy of acquiring patent rights under research, development and experimental contracts has been referred to the patent department for reply.

Our policy is as follows:

1. We do not acquire title to subcontractors' inventions under defense contracts. We operate under the patent rights clause 9–107.2 of ASPR and with respect to subcontractors, we follow the provisions of paragraph (g) of this clause.

2. We do not acquire licenses from subcontractors under their inventions made during the performance of defense contracts. As stated above, paragraph (g) of 9–107.2 covers the procedure which we follow which is for the benefit of the Government.

3. With respect to the matter of acquiring title to contractors' inventions under our own nondefense contracts, it is our policy not to acquire title for the very good reason that most contractors like ourselves refuse to accept a contract of this kind on this basis. We have, in the past, entered into very few development contracts for the reason that Westinghouse is a research and development company and prefers to do this kind of work for itself. As you know, most contractors are quite reluctant to enter into a contract which provides for transfering of titles to inventions which it makes, particularly where these inventions may relate to its own general line of activity.

In some few instances, we may enter into a joint development agreement, but, in this type of agreement, each party retains title to its own inventions. Sometimes, not always, each party grants the other a free nonexclusive license under patents acquired covering inventions made during the performance of the contract. If joint inventions are made, each party acquires an undivided one-half interest, which is the usual procedure with respect to joint inventions.

4. As explained in paragraph 3 above, we may acquire a nonexclusive license, particularly if the invention made by the other party relates to our own product activity. In some instances, there is no exchange of licenses. We have only a few of these joint development agreements.

I believe that this covers the four categories of information you requested, but, if not, we shall be glad to give you any additional information you may require.

Sincerely yours,

G. M. CRAWFORD,
General Patent Attorney.

NORTH AMERICAN AVIATION, INC.,
Los Angeles, Calif., January 11, 1960.

Hon. PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense (Supply and Logistics),
Washington, D.C.

DEAR MR. LEBOUTILLIER: Reference is made to your letter dated December 22, 1959, which I acknowledged by my letter of December 29, 1959.

I am pleased to furnish the following in response to the four items of inquiry contained in your letter:

1. We have not acquired title to any patent covering an invention made by a subcontractor under our Department of Defense contracts. It is our general policy not to acquire title to inventions under these circumstances. To protect the interest of all parties concerned, our subcontracts often contain provisions

whereby title may be acquired in the event the subcontractor elects not to file patent applications. We also engage consultants from time to time to assist with specific problems. Our form of consultant agreement provides for our taking title to inventions which the consultant may make in the performance of the services which he renders. If any consultant desires to take title to such inventions, the form of agreement may be amended to permit him to do so provided he files patent applications and otherwise protects the rights of the parties, including the Government. The nature of the consultant's services usually does not involve the making of inventions and to date title has not been acquired to any invention made by a consultant.

2. It is our policy not to acquire any licenses under inventions made by our subcontractors under Department of Defense contracts where the articles being developed are outside of our product line. Where the development is within the product line of the company, often the aid and assistance given to the subcontractor is such as to warrant acquiring a nonexclusive, royalty-free license and an effort is made under these circumstances to negotiate such a license. The acquisition of such a license, however, is a minor part of the negotiation, and if it develops that we are not equitably entitled to a license or if the subcontractor is the one best qualified to perform the work and refuses to grant the license, we do not acquire any such rights.

3 and 4. With respect to research, developmental, or experimental contracts which do not come under our Government contracts, it is our policy to negotiate for title to inventions where the work to be performed is specifically to improve our products. Otherwise, a nonexclusive royalty-free license is obtained.

It is hoped that the foregoing information will be of assistance to you. In the event you have further questions, we shall endeavor to discuss them.

Sincerely yours,

J. L. ATWOOD, *President.*

RAYTHEON CO.,
Waltham, Mass., January 13, 1960.

Mr. PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense (Supply and Logistics),
Department of Defense, Washington, D.C.

DEAR MR. LEBOUTILLIER: This is in answer to your letter of December 22, 1959, in which you asked for information concerning Raytheon's policies in respect to obtaining invention rights under Defense Department research, developmental, or experimental contracts.

1. It is the company's policy not to seek to obtain title to subcontractors' inventions under such contracts.

2. It is the company's policy to request the grant of a nonexclusive royalty-free license for commercial purposes for such inventions only where the subcontractor has no objection to such a grant. Since most of our subcontractors are interested in preserving their commercial rights, in practically every instance such a license has not been obtained. As a result, during the last several years, probably less than one-half dozen inventions have been reported to the company by subcontractors with respect to which the company has obtained such a license.

3. The company's policy is to retain title to those inventions which it makes under its prime defense research, developmental, or experimental contracts and which appear to have sufficient commercial value to justify the expense of seeking to obtain patents covering them. During 1958 and 1959 the company reported to the Government a total of about 137 inventions as being made under such contracts. The company elected not to obtain title under about 77 percent of such inventions and filed patent applications in its own name on the remaining 23 percent.

4. With respect to the inventions made under such Defense contracts upon which the company elects not to file patent applications, the company automatically obtains the license provided in the patent rights contract clause set forth in the "Armed Services Procurement Regulation," section 9–107(b).

Sincerely yours,

C. F. ADAMS.

APPENDIX XV(A)

COPY OF LETTER ADDRESSED TO 20 LARGE PRIME CONTRACTORS BY THE ASSISTANT SECRETARY OF DEFENSE, AT THE REQUEST OF SENATOR LONG

ASSISTANT SECRETARY OF DEFENSE,
SUPPLY AND LOGISTICS,
Washington, D.C., December 22, 1959.

Mr. E. D. JOHNSON,
President, General Dynamics Corp.,
New York, N.Y.

DEAR MR. JOHNSON: At a hearing on December 10, 1959, before the Subcommittee on Monopoly of the Select Committee on Small Business, U.S. Senate, the chairman, Senator Russell Long, asked the Department of Defense to provide the subcommittee with certain information relating to the patent policies of the Department's 20 largest prime contractors. Since the Department does not possess the information desired, your help is requested to make our answer to the subcommittee as responsive as possible.

It was explained at the hearing that the Department of Defense pursues a policy of acquiring only a royalty-free license to inventions made or first actually reduced to practice under a contract having research, development, or experimental work as one of its purposes. It was further explained that under the standard patents clause, ASPR 9–107.2) the prime contractor is to exert all reasonable effort to include similar provisions in pertinent subcontracts or to obtain a waiver from the contracting officer in the event of a refusal by the subcontractor before proceeding with the subcontract. The clause expressly provides that the prime contractor is not precluded from negotiating separately with the subcontractor to acquire on its own behalf rights in the subcontractor's inventions, but that any costs applicable to this separate transaction will not be paid in any way by the Government.

On the latter point, the subcommittee wants to know whether Defense prime contractors follow a policy of acquiring licenses or titles to subcontractors' inventions under Government contracts calling for research, development, or experimentation and whether they acquire licenses or titles to their contractors' inventions under their own non-Defense contracts of these types.

The Department of Defense would appreciate information for the purpose of responding to the subcommittee on the policy of your corporation under research, developmental, or experimental contracts with respect to—

(1) acquiring title to subcontractors' inventions under Defense contracts;
(2) acquiring license to such inventions;
(3) acquiring title to contractors' inventions under your own contracts;
(4) acquiring license to such inventions.

If it is your policy to determine these issues on a case-by-case basis, it would be helpful to have the approximate percentage of titles, licenses, and no rights acquired over a representative 2-year period.

The Department of Defense will appreciate your cooperation.

Sincerely yours,

PHILIP LEBOUTILLIER, Jr.,
Deputy Assistant Secretary of Defense
(Supply and Logistics).

Same letter to—

Mr. W. M. Allen, president, Boeing Airplane Co., 7755 East Marginal Way, Seattle, Wash.

Mr. J. L. Atwood, president, North American Aviation, Inc., Los Angeles International Airport, Los Angeles, Calif.

Mr. Robert Paxton, president, General Electric Co., 1 River Road, Schenectady, N.Y.

Mr. C. S. Gross, president, Lockheed Aircraft Corp., Postoffice Box 551, Burbank, Calif.

Mr. D. W. Douglas, Jr., president, Douglas Aircraft Co., 3000 Ocean Park Boulevard, Santa Monica, Calif.

Mr. W. P. Gwinn, president, United Aircraft Corp., 400 Main Street, East Hartford, Conn.

Mr. W. H. Bergen, president, Martin Co., Baltimore, Md.

Mr. Howard R. Hughes, president, Hughes Aircraft Co., Florence Avenue and Teale Street, Culver City, Calif.
Mr. F. R. Kappel, president, American Telephone & Telegraph Co., 195 Broadway, New York, N.Y.
Mr. J. S. McDonnell, Jr., chairman and president, McDonnell Aircraft Corp., Box 516, St. Louis, Mo.
Mr. H. F. Vickers, president, Sperry-Rand Corp., 30 Rockefeller Plaza, New York, N.Y.
Mr. C. F. Adams, president, Raytheon Manufacturing Co., Willow Street, Waltham, Mass.
Mr. L. L. Colbert, president, Chrysler Corp., 341 Massachusetts Avenue, Detroit, Mich.
Mr. L. A. Swirbul, president, Grumman Aircraft Engineering Corp., Bethpage, Long Island, N.Y.
Mr. M. I. Peale, president, Republic Aviation Corp., Farmingdale, Long Island, N.Y.
Mr. Thomas J. Watson, Jr., president, International Business Machines Corp., 590 Madison Avenue, New York, N.Y.
Mr. M. P. Ferguson, president, Bendix Aviation Corp., Fisher Building, Detroit, Mich.
Mr. M. W. Cresap, president, Westinghouse Electric Corp., 3 Gateway Center, Pittsburgh, Pa.
Mr. J. F. Gordon, president, General Motors Corp., 3044 West Grand Boulevard, Detroit, Mich.

APPENDIX XVI

(Referred to on p. 285)

REPORTING OF RESEARCH AND DEVELOPMENT DATA TO THE DEPARTMENT OF DEFENSE BY CONTRACTORS

(Information subsequently supplied by the Department of the Air Force and submitted to the Senate Small Business Committee by G. C. Bannerman, Director for Procurement Policy, Department of Defense)

The terms of research and development contracts state what data is required and when it must be delivered. Such contracts usually provide that monthly progress reports will be furnished. At the time the contract is made, a project officer with scientific and technical competence in the field involved is assigned to each contract. It is his responsibility to work with the contractor and review the periodic reports to make certain that the data to be furnished complies strictly with the contract terms. To be specific about when data is delivered would require knowledge of the terms of a particular contract, but, in general, the data, as a completed entity, is furnished upon completion of a research and development contract; however, the periodic reports may contain data in various stages of completeness, depending upon the requirements of the particular contract. In addition to the project officer whose responsibility is scientific and technical, there is an administrative contracting officer who handles the normal operational aspects of a contract. Air Force Procurement Instruction 9–202.1(4)(B) and (C) provides:

"(B) Contracts which require delivery of data, regardless of whether a specific price is quoted therefor, and regardless of whether the contract stipulates 'No charge for data' or 'Data price included in the costs of end item(s),' will not be deemed to be fulfilled until delivery and acceptance of the data.

"(C) Under any contract which requires the delivery of data, the accounting and finance office will be advised by the contracting officer to withold final payment until DD Form 250, 'Materiel Inspection and Receiving Report (Domestic),' is obtained through regular channels indicating that data has been delivered and accepted."

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